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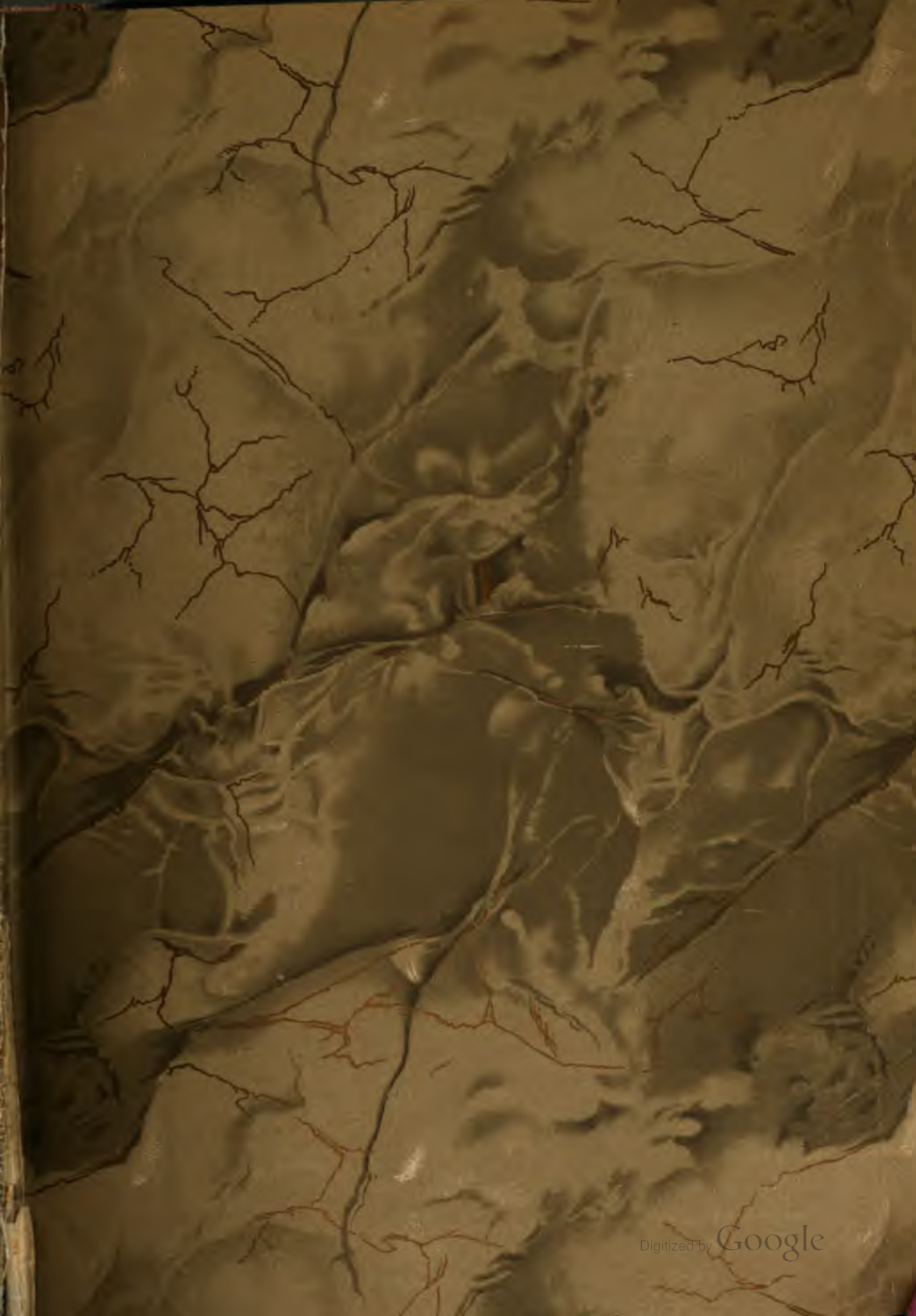
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KEY TO PRONUNCIATION.

ā	far, father	ñ	Span. ñ, as in <i>cañon</i> (cān'yōn), <i>piñon</i> (pēn'yōn)
ā	fate, hate	ng	mingle, singing
a or ă	at, fat	nk	bank, ink
ā	air, care	ō	no, open
ā	ado, sofa	o or ǒ	not, on
ā	all, fall	ô	corn, nor
ch	choose, church	ó	atom, symbol
ē	eel, we	o	book, look
e or ě	bed, end	oi	oil, soil; also Ger. <i>eu</i> , as in <i>bautel</i>
ē	her, over: also Fr. <i>e</i> , as in <i>de</i> ; <i>eu</i> , as in <i>neuf</i> ; and <i>oeu</i> , as in <i>boeuf</i> , <i>coeur</i> ; Ger. <i>ö</i> (or <i>oe</i>), as in <i>ökonomie</i> .	ō or oo	fool, rule
ē	befall, elope	ou or ow	allow, bowsprit
ē	agent, trident	s	satisfy, sauce
ff	off, trough	sh	show, sure
g	gas, get	th	thick, thin
gw	anguish, guava	th	father, thither
h	hat, hot	ū	mute, use
h or H	Ger. <i>ch</i> , as in <i>nicht</i> , <i>wacht</i>	u or ū	but, us
hw	what	ü	pull, put
i	file, ice	ü	between u and e, as in Fr. <i>sur</i> , Ger. <i>Müller</i>
i or ĭ	him, it	v	of, very
i	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din	y	(consonantal) yes, young
j	gem, genius	z	pleasant, rose
kw	quaint, quite	zh	azure, pleasure
ñ	Fr. nasal <i>m</i> or <i>n</i> , as in <i>embonpoint</i> , <i>Jean</i> , <i>temps</i>	'	(prime), " (secondary) accents, to indicate syllabic stress

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Richelieu, Chamblay, shān-blā, or Sorel, sō-rēl', a river in Canada, in the Province of Quebec; the outlet of Lake Champlain, and a tributary of the Saint Lawrence River. It is 80 miles long, from one to two miles wide in some places and from 1,000 to 1,200 feet in other parts. It is navigable its whole length, except a short distance where rapids are an obstruction. A canal has been built around the rapids. In the valley of this river, Chamblay Valley, were made some of the first settlements in Canada. The river was of importance in the discovery and settlement periods in America, as it was part of the great waterway into the interior; and for over two centuries, beginning with Champlain's Iroquois campaign in 1609, it was the scene of many battles.

Richepin, Jean, zhōn rēsh-pān, French poet and dramatist: b. Médéah, Algeria, 4 Feb. 1849. He began the study of medicine with his father, a physician, but gave it up and entered the Ecole Normale in the Department of Literature. After 1870 he engaged in journalism, editing 'L'Est,' and contributing to 'Mot d'Ordre,' the 'Corsaire' and 'Vérité,' in which latter he published 'Les Etapes d'un Refractaire.' Shortly afterward he published 'Chanson des Gueux,' for which he was fined and obliged to spend a month in prison, during which time he wrote 'Morts bizarres.' Works of this character have placed him among the most advanced of the naturalistic school; the boldness of his expression and the license of his subject have brought to him both applause and condemnation. In reply to criticism he admitted in 1881, in defense of his works, that his coarseness was perhaps unnecessary and repugnant, but not immoral. His works include verses under titles such as 'Caresses' (1877); 'Blasphèmes' (1884); 'La Mer' (1886); 'Mes Paradis' (1894); of romances 'Madame Andre' (1874); 'Sophie Monnier' (1884); 'Césarine' (1888); 'Braves Gens' (1888), besides many others; and of dramas 'Nana Sahib' (1882); 'Monsieur Scapin' (1886); 'Le Flibustier' (1888); 'Par le Glaive' (1892); 'Vers la Joie' (1894); 'Chemineau' (1897). He published also a work entitled 'Théâtre Chimérique' (1896) in 27 acts in prose and verse.

Richfield, rīch'fēld, Utah, county-seat of Sevier County; on Rio Grande Western railroad; 135 miles south of Salt Lake City. It was incorporated in 1878. It is the centre of an agricultural and stock-raising region. The public school system includes a high school founded in 1896; there is also an association library. Pop. (1910) 2,128.

Richfield Springs, N. Y., village in Otsego County; on the Delaware, Lackawanna & Western railroad; about one mile from Schuyler Lake, 25 miles south by east of Utica, and 13 miles north by west of Cooperstown. It is in a productive agricultural region; but the village is a well-known health resort on account of its large number of mineral springs. It is also

a famous summer resort. Nearby are many places of attraction, as Otsego Lake and vicinity. It has several small manufacturing establishments which more than supply local needs. The place was settled about the middle of the 18th century, but a permanent settlement was not made until after the Revolution. It was one of the favorite localities of the Indian tribes of eastern New York. Pop. (1910) 1,503.

Richford, rīch'fōrd, Vt., village in Franklin County; on the Missisquoi River, and on the Central Vermont and Canadian Pacific R.R.'s; 45 miles northeast of Burlington. It was first settled in 1795 and incorporated as a village in 1878. The village is built on both sides of the river which affords good water power; the lumber interests exceed all others in importance, and there are several lumber, saw, and planing mills. It is also in a maple sugar and agricultural region, and has a good trade, being a port of entry from Canada. It contains a high school. Pop. (1910) 2,907.

Richibucto, rīsh-ē-būk'tō, formerly Liverpool, Canada, the capital of Kent County, New Brunswick, at the mouth of Richibucto River, 46 miles northeast of Saint John. It is a port of entry and the eastern terminus of a branch line connecting with the Intercolonial Railway at Kent Junction. The river is navigable for 15 miles, and there is a considerable export trade in lumber and fish. Ship-building is carried on.

Richland (rīch'land) **Center**, Wis., city, county-seat of Richland County; on Pine River and on the Chicago, Milwaukee & St. Paul railroad; 55 miles north-northwest of Madison. It was settled in 1849 and was made the county-seat in 1852. It is the centre of an agricultural, stock-raising, and dairying region, and has a large export trade in flour, cheese, etc. The river furnishes water power for manufacturing; and the city contains flour and saw mills, a tannery, and brick kiln. There is a public high school. Pop. (1910) 2,392.

Richman, rīch'man, **Irving Berdine**, American lawyer and diplomat: b. Muscatine, Iowa, 27 Oct. 1857. He was graduated from the State University of Iowa in 1883 and admitted to the bar in 1885. He was elected to the lower house of the State legislature in 1889 and 1891, and was United States consul-general in Switzerland, with residence at Saint Gall, 1893-8. He has published: 'John Brown Among the Quakers and Other Sketches' (1894); 'Appenzell; Pure Democracy and Pastoral Life in Inner Rhoden' (1895); 'Rhode Island: Its Making and Meaning,' a historical work of much importance (1902).

Richmond, rīch'mōnd, **Countess of**. See **BEAUFORT, MARGARET**.

Richmond, Dean, American capitalist: b. Barnard, Vt., 31 March 1804; d. New York 27 Aug. 1866. He engaged successfully in the refining and selling of salt at 15, was a director in a Syracuse bank before he was of age and afterward engaged as a shipping and produce

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merchant at Buffalo. He was a leader in the movement which consolidated seven separate corporations into the New York Central Railroad Company in 1853, was its vice-president in 1853-64 and president in 1864-6. He was a recognized political leader but declined public office.

Richmond, Legh, English clergyman: b. Liverpool 29 Jan. 1772; d. Turvey, Bedfordshire, 8 May 1827. He was graduated from Cambridge in 1794, took orders in the Church of England in 1797, and in 1798 became curate of Brading in the Isle of Wight. In 1805 he was appointed chaplain in the Lock Hospital, London, and later in the same year became rector at Turvey, where he remained until his death. He was well known as a leader in the evangelical party, and wrote several tracts which were widely circulated, among them: 'The Dairyman's Daughter,' of which more than 4,000,000 copies in 19 different languages were circulated; 'The Negro Servant,' etc. He also published: 'The Fathers of the English Church, or a Selection from the Writings of the Reformers and Early Protestant Divines of the Church of England' (8 vols., 1807-11). Consult: 'Life,' by Grimshawe (1826, edited by Bedell 1846).

Richmond, Sir William Blake, English painter: b. London 29 Nov. 1843. He studied in the schools of the Royal Academy, where he received two silver medals in 1857 and had his portrait of his two brothers hung at the exhibition in 1861. He has traveled extensively in Italy, Greece, and Egypt studying the remains of ancient art, whence he has derived many subjects for his work. From 1878 to 1883 he was Stude professor at Oxford. His works include 'The Protesion of Bacchus' (1865-8); 'The Life of Women' (1870), a series of frescoes for J. S. Hodgson of Haslemere; 'Electra at the Tomb of Agamemnon' (1877); 'Behold the Bridegroom Cometh' (1881); 'Release of Prometheus' (1882); 'Audience at Athens during the Representation of Agamemnon' (1885), now in the Birmingham Gallery. He has painted portraits of Darwin, Gladstone, Browning, William Morris, Holman Hunt, and Lord Lyttelton. Most notable of his works are the interior decorations and the glass mosaics of St. Paul's Cathedral. This work was executed by a staff trained under his personal supervision. He is an earnest advocate of the development of mosaic work in England, believing that this art should be applied only in the country and under the conditions of light in which the finished product is to remain. In 1895 he became a Royal Academician, and has been professor of painting at the Royal Academy. Consult his article on Mosaics in Vol. XXXI. of the New Volumes of the 'Encyclopædia Britannica.'

Richmond, Australia, a city of Victoria, suburban to Melbourne (q.v.). Pop. 38,000.

Richmond, Canada, the capital of Wolfe and Richmond counties, Quebec, 76 miles east of Montreal, on the Saint Francis River, an affluent of the Saint Lawrence. Its chief institution is Saint Francis College, affiliated to McGill University. The town has railway works, machine shops, and other industrial establishments.

Richmond, England, an ancient town in the county and 42 miles northwest of York (North Riding), on the left bank of the Swale. In and around the town are numerous interesting remains of antiquity, the most remarkable of which is the castle, comprising an area of nearly six acres, and one of the most majestic ruins in England; its great tower, about 100 feet high, is a fine and very perfect specimen of the Norman keep.

Richmond, Ind., city, county-seat of Wayne County; on the Whitewater River, and on the Pittsburg, C. & St. L., the Grand Rapids & I. R.R.'s; 68 miles east of Indianapolis and 70 miles northwest of Cincinnati. The Richmond Interurban and the Dayton & Western traction lines connect the city with all nearby places. Richmond was settled and platted in 1816 by Friends from North Carolina. It was incorporated in 1834 and chartered as a city in 1840. The city has about 300 manufacturing establishments, employing about 3,500 persons. The chief manufactures are threshers, drills, plows, engines, boilers, carriages, milling machinery, clothing, flour, and dairy products. It is the commercial and industrial centre of a large portion of the county. It has a number of fine public buildings, chief of which are the churches and schools. There are 26 churches, 10 public school buildings, two Roman Catholic parish schools, and one Lutheran parish school. Other educational institutions are Earlham College (Friends), Saint Mary's Academy (R. C.), one business college, and the Morrison-Reeves Free Public Library. The Eastern Indiana Insane Hospital, a State institution, is located here; also other charitable institutions. The three National banks have a combined capital of \$350,000; the annual amount of business is \$2,400,000. The government is vested in a mayor and a council of 14 members elected biennially by the people. The metropolitan police board is appointed by the governor. Pop. (1910) 22,324.

B. F. WISSLER,
Editor 'Sun-Telegram.'

Richmond, Ky., city, county-seat of Madison County; on the Louisville & N. and the Louisville & A. R.R.'s; about 25 miles south-southeast of Lexington and 135 miles east-southeast of Louisville. It is in an agricultural region; in the vicinity is found an excellent building stone. The chief manufactures are tobacco and dairy products, and the trade is chiefly in farm and tobacco products, cattle, and horses. Its educational institutions are Madison Institute, under the auspices of the Church of the Disciples, Walter's Collegiate Institute, a Presbyterian institution, and public elementary schools. One of the most desperate battles of the Civil War was fought at Richmond. The Confederate forces under E. Kirby Smith defeated a much larger Federal force under Manson and Nelson. Pop. (1890) 5,073; (1900) 4,658; (1910) 5,340.

Richmond (Ky.), Battle of, the most decisive Confederate victory of the Civil War. On 14 Aug. 1862 Gen. E. Kirby Smith left Knoxville, Tenn., to unite with Gen. Bragg in northern Kentucky. He passed through Big Creek Gap of the Cumberland Mountains and, leaving Gen. Stevenson's division to observe

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the Union forces at Cumberland Gap, penetrated Kentucky with about 6,000 men. Preceded by Col. J. S. Scott's cavalry force of 900 men, he moved in the direction of Frankfort, threatening both Louisville and Cincinnati. Gen. Lew Wallace, with a regiment, hastened from Louisville to Lexington, and there found other forces, over which he was placed in command; new regiments came from north of the Ohio; but as Wallace was about to move forward and oppose Smith he was superseded by Gen. Nelson, who had been ordered by Gen. Buell to take charge of affairs in Kentucky. Upon his arrival Nelson organized the troops at Lexington into a division of three brigades, under Gens. M. D. Manson, Charles Cruft, and J. S. Jackson; and hearing that the Confederates were approaching, he sent forward some Kentucky cavalry to oppose them. There were several sharp cavalry affairs, in which the Union cavalry showed such aggression that Kirby Smith determined to make an immediate attack upon the Union forces at Richmond, although his troops were jaded by long and laborious marches, and Gen. Heth's division of 4,000 men was still far to the rear. He had for the attack Cleburne's and Churchill's divisions of 6,000 men and Scott's cavalry brigade of about 850, and the advance was ordered for the morning of 30 August. Scott's cavalry encountered Manson's brigade about half a mile south of Rogersville, and Cleburne, coming up with two brigades, attacked Manson, who, reinforced by a regiment of Cruft's brigade and a battery, endeavored to turn Cleburne's right, but was repulsed. Meanwhile Churchill's division had come to Cleburne's support; a brigade flanked Manson's right and drove it back in disorder; and as the rout became general, another of Cruft's regiments came up, but was quickly repulsed with heavy loss. Another position was taken farther to the rear, where the troops were under partial cover, with artillery on the flanks. This the Confederates soon attacked; Churchill's division struck Cruft's brigade, which was on the right, and drove it back in disorder; and Cleburne advancing in front, Manson's entire line went back, the Confederates in close pursuit. Manson had but partially formed another line in front of Richmond, when Gen. Nelson came on the field and selected a new line near the town and cemetery; and the troops, barely 2,200 in number, had scarcely taken position when the Confederates were upon them in flank and front, fired about three volleys, and the Union troops gave way in utter rout. Early in the day Scott's cavalry had gained the road in rear of Richmond, and the knowledge of the fact increased the demoralization. Nelson, wounded, narrowly escaped to Lexington and thence to Louisville. Manson was wounded and taken prisoner, with over 4,000 of his men, while nine guns, over 6,000 muskets, and the entire wagon-train were lost. The fragments of the army made their way to Louisville. The Union troops engaged numbered 6,500 raw men; the Confederates about 6,800 veteran troops. The Union loss was 206 killed, 844 wounded, and 4,303 captured or missing, an aggregate of 5,353. The Confederate loss was 78 killed, 372 wounded, and one missing, an aggregate of 451. Gen. Heth, with his division of 4,000 men, joined Smith after the battle, and marched to Lexington,

where he arrived 2 September; and the legislature, then in session at Frankfort, fled to Louisville. Heth marched northward to Cynthiana, and to within a few miles of Covington, to threaten Cincinnati, which he found too well defended to attack, and being in turn threatened, he withdrew to join Smith, who waited at Lexington to join forces with Gen. Bragg, then operating against Gen. Buell. (See PERRYVILLE, BATTLE OF.) Consult: 'Official Records,' Vol. XVI.; Van Horne, 'History of the Army of the Cumberland,' Vol. I.; The Century Company's 'Battles and Leaders of the Civil War,' Vol. III. E. A. CARMAN.

Richmond, Maine, town in Sagadahoc County, on the Kennebec River and on the Maine Central railroad, 37 miles north-northeast of Portland. It was first settled in 1700; in 1719-20 a fort was erected here for the defense of the settlers against the Indians; this fort twice resisted attack, and was finally dismantled in 1754. The town was incorporated in 1823. The chief industries of the town include a cotton mill and shoe factory, ice cutting, and agriculture; there are also saw and planing mills and some trade in lumber. The town has a public high school, with which the Richmond Academy (incorporated 1861) was united, and also a public library. Pop. (1890) 1,394; (1900) 2,097; (1910) 1,858.

Richmond, Mo., city, county-seat of Ray County; on the Atchison, Topeka & Santa Fé railroad; 58 miles southeast of St. Joseph. The county-seat was removed to Richmond from Bluffton in 1827. It is the centre of a fertile agricultural and stock-raising region; and there are coal mines in the vicinity which yield excellent quality of bituminous coal. It also has wagon and plow factories, flour mills, and a foundry. It contains the county court-house, and has electric lights and modern waterworks. It is well provided with educational facilities, having two public high schools, of which one, the Lincoln high, is for colored pupils; and is also the seat of Woodson Institute, a coeducational secondary school under the auspices of the Methodist Episcopal Church, South. Pop. (1910) 3,664.

Richmond, Va., city, port of entry, capital of the State; county-seat of Henrico County; on the James River, the Richmond-Washington Line, the Atlantic Coast Line, the Chesapeake & Ohio, the Seaboard Air Line, and the Southern R.R.'s; about 115 miles almost due south of Washington, D. C., and 90 miles from the mouth of the river at Chesapeake Bay. Area 4.85 square miles, but including the suburbs, 16 square miles. The surface is hilly, rising from the river and the valley of Shockoe Creek in a series of hills, almost terrace-like in formation, until it reaches altitudes of from 170 to 250 feet above sea-level, at which altitudes there are plateaus constituting the principal residential sections. It was originally built on seven hills, and was often called the "Modern Rome." In 1842, when Charles Dickens visited the city, it had extended its limits to another hill, and he wrote of it as "delightfully situated on eight hills overhanging James River."

Regular lines of steamers, the Virginia Navigation Company and Old Dominion, connect

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the city with Atlantic and Chesapeake ports, and furnish a cheap outlet for shipping products to other parts of the United States and to foreign ports. James River (q.v.) furnishes water power which is used extensively for manufacturing and of the total horse-power 14,000 utilized, 10,000 horse-power being electrically developed, it propels the entire street car system and supplies the electric lights of the city. Several bridges (four railroad and two for vehicles, street cars and foot passengers) cross the river and connect the city with Manchester, and beyond its suburbs with Forest Hill Park, Bonair, Granite, Spring Hill, and other places. A seventh is being constructed especially for the street cars.

There are about 120 miles of streets, 40 miles of which are sewered, and about 30 paved. The streets are all fairly wide. Main, the chief thoroughfare, is a broad, well-built street; Broad is the widest street in the city; Grace and West Franklin, as well as some of the suburbs, are residential sections. The water supply, which when clear is most excellent for domestic and all other purposes, is obtained from the James River at two points above the city. The water is pumped into two reservoirs from which it is piped for distribution throughout the city, and an extensive settling basin and system for insuring its clarification at all times is being pushed to completion. The natural drainage makes the city healthful, and warm winters and temperate summers attract many home seekers who desire a mild climate.

Industries.—The chief industries of the city are connected with the preparation of tobacco for local use and for shipment to outside markets. The Federal census of 1900 gives 49 establishments for the manufacturing of tobacco; the amount of capital invested, \$3,054,450, and the value of the products for the year mentioned, \$10,537,803. There were 5,666 employees, to whom were paid \$1,506,090 wages for the same year. The establishments were 17 smoking and chewing tobacco factories, 22 cigarette and cheroot factories, and 10 stemmeries and packing houses. The foundries and machine shops number 18 establishments, with invested capital, \$5,164,103; and the annual value of products \$2,594,186. There were six establishments engaged in preparing fertilizers for market. The invested capital was \$2,163,731, and the value of the products, \$1,045,063. Other manufacturing establishments were wagon and carriage works, lumber mills, railroad car factory, confectionery factory, and baking powder works. In 1909 the city contained 380 manufacturing establishments which represented 100 different industries. The capital invested in manufacturing concerns was \$30,660,000; there were 26,998 persons employed, and the annual wages amounted to \$3,307,000. The amount paid for raw material the same year was \$24,252,000; and the total product for the year was valued at \$47,358,000.

Commerce.—The location and the facilities for transportation make Richmond the commercial centre of a large extent of southeastern Virginia, and an important point of distribution for the Carolinas and adjoining Southern States. For the year ending 30 June 1909, the custom house records showed the amount of imports as \$666,984; but these figures are entirely misleading as a measure of its foreign trade, as

its imports and exports are principally cleared through the custom-houses of New York and other northern ports. The amount of trade with the United States Atlantic coast cities and the cities and towns of the interior of the State is very large.

Banking and Finances.—The city had over 30 banking institutions in 1910, including 6 national banks. There were also state banks, savings banks, trust companies, private bankers and brokers, and loan and deposit companies. The amount of exchanges of the Richmond clearing house for the year ending Sept. 30, 1910, was \$385,865,200; total resources of State and national banks, about \$35,000,000. The assessed valuations of the city in 1910 were, real, \$44,560,516; personal, \$37,063,705; total, \$137,516,468. The receipts for a single year a decade ago were something over \$1,875,000; and the expenditures a little less. The chief items of expense in the budget for 1904 were, to the sinking fund for interest and redemption, \$473,311.26; a special appropriation of \$20,000 for opening and widening streets and one of \$50,000 for a new gas holder in west end are also in this budget; for schools, \$179,743.74; police department, \$113,100; fire department, \$116,150; waterworks, \$78,385; gas works, \$191,500; streets, \$183,010. The net public debt was (1910) \$8,804,263. The municipal assets, including waterworks, gas plant, city-hall, parks, market-houses, school buildings, etc., were valued at \$8,000,000; and there was to the credit of the sinking fund in bonds and cash something over \$830,000.

Public Buildings, Parks, and Monuments.—Richmond is historic ground and her noted public buildings are valued more on account of their association than for the architectural merits which they possess. Capitol Square, on Shockoe Hill, has an area of 12 acres. It takes its name from the State Capitol which is on the square. The Capitol was built after a model procured by Thomas Jefferson when he was in France, and which was patterned after Maison Quarriés of Nismes, an ancient Roman temple, only changing the columns from the Corinthian to the Ionic. The corner-stone was laid in 1785, and on 19 Oct. 1789, the eighth anniversary of the surrender of Lord Cornwallis at Yorktown, the Virginia State Legislature convened in the new Capitol. The model for the Capitol sent from France by Jefferson is still in the building. In the rotunda is the most valuable piece of marble in America, Houdon's statue of Washington, modeled from life. The General Assembly of Virginia (1903-1904) appropriated \$250,000 for the purpose of adding wings to the east and west sides of this building, for steps to the imposing portico at the southern end, and for some interior improvements. These additions will be in harmony with the architectural style of the original building, will preserve its most characteristic features and furnish additional room, much needed by the General Assembly and the various State departments.

On the same square is the library building, which contains the parole signed by Lord Cornwallis at Yorktown, the original Virginia Bill of Rights, and the Virginia ordinance of secession. The executive mansion is on this square, on land which was once a part of Nathaniel Bacon's plantation. The old building known as the Bell House has many interesting associations.

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1. Washington Monument, near State Capitol.

2. Capitol Square, showing the new City Hall Building.

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The old bell, purchased in 1790, was for years a "voice to the people."

Among the famous pieces of statuary on the grounds is the equestrian statue of Washington, by Thomas Crawford (q.v.). Of the statues at the base Crawford completed only Thomas Jefferson and Patrick Henry; the other pieces, George Mason, John Marshall, Thomas Nelson, and Andrew Lewis, were made by Randolph Rogers. Nearby stands a fine marble statue of Henry Clay, by Joel T. Hart; also several other marble statues and a bronze statue of "Stonewall" Jackson, by Foley. Three fountains add to the beauty of the square. The largest park of the city has an area of 300 acres. It has a lake, a fine boulevard, and the chief reservoir. Monroe Park has many fine trees and some good pieces of statuary. Libby Park is on Libby Hill. It is terraced from Main Street to the summit, and a monument in honor of the Confederate soldiers and sailors stands on the highest point. Chimborazo Hill Park has an area of 36 acres. A Government road leads from the park to the National Cemetery where are buried 6,547 Federal soldiers who fell in the attempts to capture the city during the Civil War. Jefferson Park is between Pleasant and Marshall streets; Gamble's Hill Park is on a relic of the James River and Kanawha Canal, still used as a race to a number of important water-power plants. It also overlooks the famous Tredegar works where cannon were made, and the no less famous Belle Isle, the site of the Old Dominion Iron and Nail Works, where a number of Federal prisoners were confined during the war between the States. Lee Circle, in the western part of the city, has a bronze equestrian statue of Robert E. Lee (q.v.), by Mercie, a French sculptor. It represents the General on "Traveller," his well-known war-horse. In Howitzer Park is a monument in memory of the Richmond Howitzer battalion. A favorite drive is the one to Hollywood, where sleep 12,000 Confederate soldiers. A monument of granite, pyramidal in form, 90 feet high and softened by a covering of Virginia creeper and ivy, has been erected to the memory of the Confederate dead soldiers. Many of Virginia's famous men are buried here. Tyler and Monroe, Presidents of the United States; John R. Thompson, the poet; Matthew F. Maury, "Pathfinder of the Seas"; John Randolph; Jefferson Davis, president of the Confederacy, and a number of Confederate Generals. The most noted parks and squares have a combined area of 358 acres; but the little squares and circles, not mentioned as noted, ornament the city, and give it an artistic air.

Other historic and prominent landmarks are the residence occupied by General Lee and his family, now the home of the Virginia Historical Society; the house occupied by Jefferson Davis while he was president of the Confederate States; and the famous Monumental Church on Broad Street, formerly called Academy Square. At one time a large wooden building, built for an Academy of Fine Arts, occupied the present site of the church. In 1788 the old building saw a brilliant gathering of "history makers," who met to discuss the document proposed as the Constitution of the United States of America. Madison, Mason, Marshall, Pendleton, Randolph, Lee, Wythe, and others were

there, and finally the Constitution as framed at Philadelphia was ratified by Virginia. Only 23 years afterward occurred in the same building at a theatre the terrible disaster which resulted in the death of 72 persons, among whom was the Governor of the State. The present church is their monument; the portico extends over their tombs and the charred remains. The house once the home of Chief Justice Marshall stands on the street named in his honor. Saint John's Episcopal Church, built in 1740, is in an excellent state of preservation and is still used for religious services. Richard Randolph, who superintended the building of the church, was a descendant of Pocahontas. In the quaint old churchyard surrounding it is the grave of George Wythe, one of the signers of the Declaration of Independence. In this church, on 20 March 1775, was held the famous Virginia Convention which met to hear a report of the first Continental Congress, and to discuss the political situation of the country. The convention feared to hold a session in Williamsburg, the capital, on account of the hostility of Lord Dunmore. The church was the only place in Richmond large enough to contain the convention. It was at this convention that Patrick Henry made his famous speech, ending with the words: "Is life so dear, or peace so sweet, as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take, but as for me, give me liberty or give me death." The place where the patriotic orator stood is pointed out to strangers. Another remarkable event occurred on 6 Jan. 1781, when Benedict Arnold, at the head of a British force of 900, entered the city, and a number of the soldiers were quartered in this old church. The oldest house in Richmond, a stone building on Main Street, was built in 1737 by Jacob Ege. It is now used as a historical museum. The Valentine Museum contains over 100,000 archaeological specimens, also many fine pictures and statues. This valuable museum was given to the city by Mann S. Valentine. His brother, Edward V. Valentine, the sculptor, has given to the museum several valuable pieces of statuary.

The most costly and the most ornate building in the city of Richmond is the City-Hall, completed about 10 years ago, at an outlay of over \$1,400,000. It is built of Richmond granite, dressed and quarry-faced, is completely fire-proof, commodious in all its appointments and should fully meet all of the requirements of the city for the next hundred years or more.

Education.—The city has an excellent school system; there are public and parish elementary schools for white and similar ones for colored pupils, a high school, normal school for whites and one for colored, Virginia Mechanics' Institute, which has evening classes, kindergartens, and a number of private schools. The secondary schools and colleges are the Richmond Female Institute (Baptist), founded in 1854; Richmond Female Seminary (P. E.); Hartshorn Memorial College for Colored Girls (Baptist), opened in 1883; Visitation Academy (R.C.), founded in 1860; Saint Peter's Academy (R. C.); Saint Joseph's Academy (R. C.); Saint Patrick's Academy (R. C.); Sacred Heart Academy (R. C.); Saint Mary's Benedictine Institute (R. C.); Training School for Kindergartners; Art School.

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of Art Club, and Saint Andrew's School, the Medical College of Virginia (1837); University College of Medicine (1893); Richmond Theological Seminary (Baptist), opened in 1867; Richmond College (Baptist), opened in 1832; and beyond the city limits, Hartshorn and two others. There are five public libraries with an aggregate of 60,000 volumes.

Churches.—The city has 130 religious organizations and 90 church edifices; 65 for white people and the others for colored. The different denominations rank according to church edifices and organizations as follows: Baptists, Protestant Episcopalians, Methodists, Presbyterians, Roman Catholics, Lutherans, Jews, Christians, Friends. The Roman Catholic Cathedral, being built with means supplied through the munificence of Mrs. Thomas F. Ryan of New York, will be the finest church edifice in the city.

Charitable Institutions.—There are here Saint Sophia's Home for the Aged; the Sheltering Arms; the Home for Incurables; Foundling Asylum; Retreat for the Sick; City Orphan Asylum; Lee Camp Soldiers' Home; and Saint Joseph's Orphan Asylum. There are a number of public and church aid societies and various charitable organizations.

Hospitals.—Saint Luke's Hospital is one of the best equipped institutions in the city.

History.—In May 1607, John Smith, Captain Newport, and others ascended the James River as far as the place where Richmond now stands. In September, 1609, Smith, who was the president at Jamestown, again ascended the river to find a better location for the colony than Jamestown. He purchased from the Indians some land near the present site of Richmond, and so pleased was he with the place that he called it "None Such."

"Forte Charles" was built below the falls, in 1645. In 1675 and in 1687 a further grant of 950 acres, which tracts included the land upon which Richmond now stands; but the city was not founded until some years later by his son, Colonel William Evelyn Byrd. This founder of Richmond seems to have been versed in methods of founding cities which are now called modern. He established two cities "on paper," one at Sohocco's, to be called Richmond, and at the "Point of Appamattuck River," to be called Petersburg. He engaged Major Mayo to lay out the squares, streets, etc. Then he proceeded to advertise his cities, inserting a notice in the Virginia 'Gazette,' April 1737, "that on the north side of James River, near the uppermost landing and a little below the falls, is lately built by Major Mayo a town called Richmond, with streets 60 feet wide, in a pleasant and healthy situation, and well supplied with springs of good water." Byrd was a learned man as well as a good advertiser. He brought to the New World a large and well selected library, a catalogue of which is in the Franklin Library in Philadelphia. He proceeded to build a mill, a warehouse, and such other buildings as were necessary. In its early days the place was called Byrd's Warehouse. In 1742 the Assembly of Virginia established the town, and the wide streets and squares were at last laid out. In 1779 the capital of the commonwealth was removed from Williamsburg to Richmond. Then the place was only a number of disconnected houses in small groups, with rough ground and

rocks intervening. Benedict Arnold entered the city in 1781 and burned a portion of it, as has been mentioned above.

In 1782 Richmond was incorporated as a city, and in 1785 the foundation of the Capitol was begun. This Capitol, from its opening in 1789 down to the present, has been the scene of many stirring historical events. In 1798-9 took place the famous debates which ended in the adoption of the resolutions, drafted by James Madison, regarding the interpretation of the Federal compact. What powerful conventions were held here when such men as Monroe, Madison, John Randolph, and Marshall were members. The convention of 1851 extended the privilege of suffrage, and here in 1861 the Act of Secession was adopted; and in June of the same year, Richmond was made the capital of the Confederate States. In July 1862, the Congress of the Confederacy convened here, and remained in session until April 1865. During the Civil War the city was the great objective point of the chief operations of the Union Army in the East. Again and again the Union forces marched to the battle cry "On to Richmond," and again and again were they repulsed. For three years, from May 1862 to April 1865, the city was almost in a state of siege; the records tell of 15 pitched battles and 25 skirmishes and sharp engagements which were fought in efforts to capture the city. When its defenders yielded, and left the city, they set fire to the arsenals and large tobacco warehouses, and burned the bridges directly after crossing them, which caused a most extensive conflagration in the principal business sections of the city. On 27 April 1870, at a contest over the mayoralty before the Supreme Court of Appeals, over 60 persons were killed by the giving away of the floor of the court room. A large number of people were in the building.

The suburbs of Richmond contribute to the charms of the city and to its history pages. The lines of earth work defenses and the marks of shot and shell are still visible. The broad, shady avenues of stately, beautiful trees lead out to battle grounds now covered with the houses and business establishments of busy, peaceful people.

Pop. (1890) 81,388; (1900) 85,050. But these figures to no extent marked the growth and prosperity of the city. With the exception of the annexation of Lee District, which was just beginning to be built up, the corporate limits had not been extended since 1867, and in many quarters the suburbs were quite quickly settled, and were undistinguishable from the adjacent districts of the city.

The rural free delivery of the Richmond post-office served a suburban population of from 25,000 to 30,000, most of which was added to the city population when the much needed expansion of the city limits went into effect. This placed it, where it legitimately belonged, in the ranks of cities beyond the 100,000 limit. Pop. (1910) 127,628.

Consult: Chesterman, 'Guide to Richmond'; Powell, 'Historic Towns of the Southern States'; Poindexter, 'Richmond'; Scott, 'Capitol of Virginia.'

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Secretary of the Virginia Historical Society,
Richmond, Va.

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Richmond (Va.). Kilpatrick's Expedition to. In February 1864 a cavalry expedition organized to make a dash on Richmond, distribute President Lincoln's amnesty proclamation, and liberate the Union prisoners in the city and on Belle Isle. The expedition was put under command of Gen. Kilpatrick, who, with 4,000 men and a battery of artillery, marched from Stevensburg, crossed the Rapidan at Ely's Ford, early on the night of 28 February, and moved swiftly to Spottsylvania Court House. Here Col. Ulric Dahlgren, with 500 men, was detached from the column, on the morning of the 29th to cross James River and enter Richmond from the south. Kilpatrick continued his course to the Virginia Central Railroad at Beaver Dam Station, thence to Ground Squirrel Bridge over the South Anna, and to a point five miles from Richmond, which was reached on the morning of 1 March. Believing that his approach was unknown, and that a small force of infantry only occupied the intrenchments, he moved on the Brook road toward the interior line of defensive works, driving in a few pickets, and found infantry and artillery in the works—500 men and six guns. He opened with artillery, and was about to attack, when he thought he saw reinforcements of infantry filing into the Confederate works, and, feeling certain that Dahlgren had failed, and that his own attack would be a bloody failure, he withdrew to Atlee Station, north of the Chickahominy, and went into camp. Here he was attacked during the night by Wade Hampton's and Bradley T. Johnson's cavalry, the latter having followed him from Beaver Dam Station. The camp of one of his brigades was captured, and Kilpatrick, retreating, was followed down the Peninsula, being joined near Tunstall's Station next day by nearly 300 of Dahlgren's men. He reached Williamsburg on the night of the 2d.

Col. Dahlgren moved from Spottsylvania Court House across the Virginia Central Railroad, near Frederickshall, to James River, near Goochland Court House, where he expected to cross the river, release the prisoners on Belle Isle, and enter Richmond from the south, to unite with Kilpatrick at 10 A.M. of 1 March. But he could find no ford, so marched by the north bank of the river, approaching Richmond late in the afternoon, and coming upon cavalry and infantry, with which he skirmished sharply until night. Hearing nothing from Kilpatrick, except his guns, heard early in the afternoon, and rightly believing that he had failed, Dahlgren withdrew, designating Capt. Mitchell, 2d New York Cavalry, to command the rear guard. In the darkness the column became broken, Dahlgren, with less than 100 men going in one direction, and Mitchell in another. Mitchell succeeded in joining Kilpatrick at Tunstall's with about 260 men. Dahlgren crossed the Pamunkey at Hanover Town, and the Mattaponi at Aylett's Ford, and about midnight 2 March fell into an ambushade and was killed. Others were killed and wounded, nearly all were captured. Capt. Mitchell reports that of the 500 men of Dahlgren's command 61 were killed and wounded, and 138 captured. The total loss of Kilpatrick's command, including Dahlgren's, was about 350. Consult: 'Official Records,' Vol. XXXIII.; Humphrey's 'From Gettysburg to the Rapidan'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV. E. A. CARMAN.

Richmond (Va.), Sheridan's Raid on the Communications with, a movement which included the battle of Yellow Tavern. At day-break 9 May 1864 Gen. Sheridan, with 10,000 cavalry and six batteries, started from near Todd's Tavern to cut the railroads entering Richmond from the north and northwest. He moved on the Telegraph road; Merritt's division crossed the North Anna at Anderson's Ford at dark and encamped; the rest of the column, harassed by a brigade of Stuart's cavalry, halted for the night on the north side of the river. The march was resumed early on the 10th, several miles of the Virginia Central Railroad destroyed, with rolling-stock and supplies, and at night Sheridan crossed the South Anna, halting at daylight of the 11th on the south bank. Early in the day Davies' brigade encountered Munford's cavalry at Ashland, on the Fredericksburg Railroad, drove it from the place, destroyed the depot and several miles of railroad, and joined Sheridan's main body at Allen's Station. Meanwhile Gen. Fitzhugh Lee's cavalry division had been rapidly marching by a circuitous route to interpose between Sheridan and Richmond, and had reached Yellow Tavern, on the Brook road, six miles from Richmond. Lee had barely 4,500 men. Sheridan's whole force advanced, Merritt's division leading, followed by Wilson's and Gregg's. Merritt attacked and gained the Brook road at Yellow Tavern, but Gen. Stuart, in command of the Confederates, seized a position on his flank and enfiladed his line with artillery. Then Custer's brigade, supported by Wilson's division, charged the flanking force, breaking it and capturing two guns. In this encounter Stuart was mortally wounded. Stuart's detached brigade, under Gen. James B. Gordon, fell upon Sheridan's rear, but Gregg drove it back toward Ashland. Fitzhugh Lee's division retreated toward Richmond. The losses on both sides were severe. Sheridan followed Lee's division and entered the most advanced line of works covering Richmond. Sheridan had intended to keep south of the Chickahominy and march by way of Fair Oaks, to make a demonstration on Richmond. Marching during the night, at daylight of the 12th he massed his force at Meadow Bridge, overlooking the line of the Virginia Central Railroad and the Mechanicsville pike. After demonstrating on the Confederate works, which were found too strong to be attacked, he determined to recross the Chickahominy at Meadow Bridge. The bridge, which had been partially destroyed, was held by some of Gordon's cavalry and a battery on the north side. Merritt's division crossed after a severe engagement, in which Gen. James B. Gordon, commanding the Confederate cavalry, was killed. Meanwhile, Wilson's division could not pass the second line of the Richmond defenses, on the Mechanicsville road, and was attacked by Barton's and Gracie's infantry brigades and some dismounted cavalry, who, advancing from the works, attacked both Wilson and Gregg, at first with success, driving Wilson in some disorder. After a severe contest the Confederates were driven back to their works, and between 3 and 4 P.M. Wilson and Gregg crossed the Chickahominy above Mechanicsville bridge, and Sheridan encamped his corps near Gaines' Mill. Next day he crossed to the south side of the Chickahominy by Bottom's bridge, marched through White Oak Swamp and, on the

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14th, encamped in the vicinity of Haxall's Landing, on James River. He made several demonstrations on the New Market road, in the direction of Richmond, and having drawn supplies from Gen. Butler's army, started on the 17th to rejoin the Army of the Potomac, marching by way of White House, on the Pamunkey. Detachments were sent to destroy the railroad bridges over the South Anna and to demonstrate on Richmond, and 24 May Sheridan rejoined Grant's army near Chesterfield bridge on the North Anna. The Union loss in the movement from 9 May was 64 killed, 337 wounded, and 224 missing. There are no reports of Confederate losses. Consult: 'Official Records,' Vol. XXXVI.; Humphreys, 'The Virginia Campaign of 1864-5'; Sheridan, 'Personal Memoirs,' Vol. II.; McClellan, 'Life and Campaigns of Gen. Stuart'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

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Richmond (Va.), Union Campaigns Against. As the capital and political centre of the Southern Confederacy, defended by its best army, Richmond became and continued to be the objective point of the Union armies. The first campaign against it was that of Gen. McDowell, which ended in Union defeat at Bull Run, 21 July 1861. (See BULL RUN; FIRST BATTLE OF.) The next campaign had its base at Fort Monroe, from which, 4 April 1862, Gen. McClellan advanced with the Army of the Potomac up the York Peninsula. After the siege and capture of Yorktown and the battle of Williamsburg (qq.v.), McClellan crossed the Chickahominy, and 30 May his outposts were within five miles of Richmond. Meanwhile, after the destruction, by her commander, of the Confederate ram Merrimac, Capt. John Rodgers, with three Union gunboats, ascended James River until he reached Fort Darling (q.v.), on Drewry's Bluff, eight miles below Richmond, where, 15 May, he was stopped by the fire of heavy guns. Com. Goldsborough, commanding the navy in those waters, now proposed to McClellan to cooperate with him in a joint naval and land attack on Fort Darling, but McClellan declined, preferring to wait until after he should have crossed the Chickahominy. The Confederate authorities were so much impressed with the gravity of the situation, when they heard that the fleet was ascending the river, that the government archives were shipped to Columbia, S. C., and the public funds were kept on cars ready for transportation.

The Confederate defense at Fort Darling was looked upon as the salvation of the Confederate capital. Strong works were now constructed by the Confederates on Drewry's Bluff and on the opposite side of the river, and to the end of the war they barred advance on Richmond by water. Elaborate works were constructed to defend the city from the land side. On 31 May Gen. J. E. Johnston, commanding the Confederate army, advanced from his works around Richmond and attacked McClellan. The battle continued two days, at the end of which the relative positions of the two armies were unchanged. (See FAIR OAKS, BATTLE OF.) On 25 June McClellan, in view of a general advance, threw forward a part of his force toward Richmond, gaining some ground, but Gen. R. E. Lee, commanding the Army of Northern Vir-

ginia, assumed the offensive on the 26th by crossing the Chickahominy and attacking McClellan's right, forcing McClellan to retreat to Harrison's Landing, on James River, after a series of hard-fought, bloody battles. (See PENINSULA CAMPAIGN OF 1862; SEVEN DAYS' BATTLES.) Richmond now had some respite. Lee invaded Maryland, and upon his return defended Richmond on the line of the Rappahannock, from which Burnside, in December 1862, and Hooker, in April 1863, unsuccessfully endeavored to force him. Lee again assumed the offensive and marched northward for an invasion of Maryland and Pennsylvania, leaving but a small force at Richmond, and Hooker, 10 June, proposed to march immediately upon the city, capture it, and then send the disposable part of his force to any threatened point north of the Potomac, but the proposition was negated by Gen. Halleck, and Hooker was informed by President Lincoln that Lee's army, and not Richmond, was his true objective. On 14 June Halleck ordered Gen. Dix, commanding at Fort Monroe, to send an expedition to threaten Richmond, and destroy the railroad bridges over the South and North Anna rivers. Dix drew troops from Suffolk and Norfolk, and on the 24th Col. Spear, with about 1,200 men of the 11th Pennsylvania, 2d Massachusetts and 12th Illinois cavalry, was sent by water up York River, landed at White House on the 25th, marched through Hanover Court House, and on the 26th attacked and captured about 100 men of the 44th North Carolina at the bridge of the Virginia Central Railroad over the South Anna, burned the bridge, and returned to White House on the morning of the 27th. Upon Spear's return Dix organized an expedition of 10,000 men, under Gen. Getty, to destroy the bridge of the Fredericksburg and Richmond Railroad over the South Anna, and an expedition of 6,000 men and 14 guns, under Gen. Keyes, to threaten Richmond by seizing Bottom's bridge over the Chickahominy. Both expeditions moved from White House on 1 July. Keyes failed to accomplish anything, being held in check by a small force under Gen. D. H. Hill. Getty, preceded by Spear's cavalry, marched from White House to Hanover Court House, which he occupied on the 4th, his advance reaching the bridge over the South Anna late in the day and making an attack, which was repulsed by Gen. John R. Cooke, who had about 4,000 men. Gen. Foster, who was in command of Getty's advance, destroyed some of the railroad track, and during the night was recalled to Hanover Court House. The depot and track at Ashland Station were destroyed, and on the 5th Getty took up the return march to White House, which was reached on the 7th, his loss being 16 killed, wounded, and missing. Dix returned to Fort Monroe and sent part of his command to the Army of the Potomac.

After the Gettysburg campaign (see GETTYSBURG, CAMPAIGN AND BATTLE OF), Gen. Lee fell back beyond the upper Rappahannock, and Gen. Meade followed. Meade was forced back to Centreville, and, renewing the offensive, pushed Lee beyond the Rappahannock and then beyond the Rapidan. Meade now essayed an advance on Richmond by passing Lee's right, but was checked at Mine Run (q.v.), 28-9 Nov. 1863.

On the morning of 6 Feb. 1864 Gen. I. I. Wistar, with 2,200 cavalry and 4,000 infantry, left Williamsburg to make a dash on Richmond and release the Union prisoners there. The cavalry advance arrived at Bottom's bridge, on the Chickahominy, about 13 miles from Richmond, before daylight of the 7th, and found the Confederates in force under Gen. Eppa Hunton, and reinforcements coming up by railroad from Richmond. A deserter from the Union army had given information of the proposed movement, troops had been sent from Richmond, Bottom's bridge taken up, and the fords obstructed. The cavalry charged one of the fords and was repulsed by canister fire with some loss, and Wistar desisted from further effort and returned to Williamsburg. To cover this movement and divert Lee's attention from it, the cavalry and two corps of the Army of the Potomac made a demonstration on the 6th upon Lee's army at Morton's Ford, the demonstration continuing on the 7th, with considerable loss. Later in the month Gen. Kilpatrick made a movement on Richmond which resulted in a lamentable failure. (See RICHMOND, KILPATRICK'S EXPEDITION TO.)

The next and final campaign against Richmond was conducted by Gen. Grant, beginning in May 1864. With the Army of the Potomac he advanced from the north, while Gen. Butler, with the Army of the James, crossed to the south side of James River and marched up its right bank. Butler was defeated at Drewry's Bluff (q.v.), 16 May, and confined to his intrenchments at Bermuda Hundred (q.v.). The Army of the Potomac began the campaign by the battle of the Wilderness (q.v.), 5-7 May, and on the 9th Gen. Sheridan set out on his raid, elsewhere described. (See RICHMOND, SHERIDAN'S RAID ON, and the BATTLE OF YELLOW TAVERN.) Grant continued his campaign in a series of sanguinary battles, and after the bloody repulse of Cold Harbor (q.v.) he abandoned the campaign north of the James, crossed to the south side of the river, 14-16 June, and invested Petersburg and Richmond from that side. (See PETERSBURG, MILITARY OPERATIONS AGAINST.) The siege began on 19 June 1864, and continued until 2 April 1865, when Petersburg was assaulted and taken, and that night Richmond was evacuated, the Union troops under Gen. Weitzel occupying it 3 April.

E. A. CARMAN.

Richmond, Borough of. See NEW YORK CITY.

Richmond College, located at Richmond, Va. It was founded in 1832 by the Baptists under the name of the Virginia Baptist Seminary; the name was changed to Richmond College in 1840. The college was closed during the Civil War; the buildings were used as a hospital by the Confederates, and as barracks by the Federals after their occupation of Richmond. The equipment was largely destroyed and much of the endowment rendered worthless, but the college was reopened in 1866, a new endowment was obtained, and it has since then had a prosperous career and has taken a leading part in Southern educational life. The work of the collegiate department is divided into nine schools, as follows: (1) Latin language and literature; (2) Greek language and literature;

(3) French and German; (4) English language and literature; (5) mathematics; (6) physics; (7) chemistry; (8) philosophy; (9) history. Courses are elected in accordance with the group system, there being three groups; the degree of A.B. and B.S. are conferred; and A.M. for graduate work. There is also a School of Law, which confers the degree of B.L. Women were admitted to the college in 1898. The campus contains 13 acres; the ground and buildings in 1910 were valued at \$600,000; the library contained 15,000 volumes, and the annual income in 1910 amounted to more than \$100,000. The students numbered 343, and the faculty 28.

Richter, rī'h'tēr, Adrian Ludwig, German painter and designer: b. Dresden 28 Sept. 1803; d. there 19 June 1884. His father, Carl August Richter, the well-known copperplate engraver, was his first teacher, as he was his father's collaborator in the production of landscapes in black and white. In 1820 he accompanied Prince Narischkin in a journey through France as draughtsman to illustrate that nobleman's travels; subsequently he spent three years, ending 1826, in Italy. He next applied himself to study the masters of the North Holland School, and chose J. Schnorr as his especial model and standard of excellence. Returning to Germany he was appointed in 1828 to a position in the School of Design at Meissen, which he held for 10 years, meanwhile acquiring a popular reputation as illustrator of 'The Vicar of Wakefield' and 'Popular Books of Germany.' He inaugurated an epoch in German illustrative art by his sympathetic interpretation of common life in Germany, his tender humor and refined fancy. While he drew on wood for book illustration, he also executed numerous etchings, mostly of Italian landscapes. The most important of his landscapes in oil, which, however, are marred by a certain coldness of treatment, are: 'Storm on Mount Gerone' (1830, in the Museum, Frankfurt-on-Main); 'Harvest Time on the Roman Campagna' (1833, Leipsic Museum); 'Schreckenstein near Aussig'; 'Landscape in the Riesen Mountains'; etc. After working for some years as professor of landscape painting in the Dresden Academy, he retired in 1876 on a pension provided by the German emperor. Consult: his autobiography, 'Lebenserinnerung eines deutschen Malers' (1855); Hoff, 'Adrian Ludwig Richter, Maler und Radierer' (1877).

Richter, Gustav, German painter: b. Berlin 31 Aug. 1823; d. there 3 April 1884. He studied under Eduard Holbein in Berlin and Cogniet at Paris, also studied at Rome. He was professor of the Berlin Academy and honorary member of the academies of Munich and Vienna. His first work to attract attention was the 'Raising of Jairus' Daughter' (1856). In 1864 he received the Grand Medal at Berlin; other medals have been conferred on him at Paris, Brussels, Vienna, and Philadelphia. His works are reproduced in vivid colored chromos. He painted many European celebrities, and of Americans a notable portrait of George Bancroft, the historian.

Richter, Henry Joseph, American Roman Catholic bishop: b. Neunkirchen, Oldenburg, Germany, 9 April 1838. He came to the United States in 1854, studied at Saint Xavier's College, New York, at Mount Saint Mary's Sem-

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inary, Cincinnati, and in 1860 entered the American College at Rome, where he was graduated in 1865. He was ordained in that year, was vice-president and professor of dogma, philosophy, and literature at Mount Saint Mary's Seminary in 1865-70, and in 1870-83 was rector at Saint Lawrence and chaplain of Mount Saint Vincent Academy. In 1883 he was consecrated first bishop of Grand Rapids.

Richter, Jean Paul Friedrich, generally known as **JEAN PAUL**, German author: b. Wandsiedel, near Baireuth, Bavaria, 21 March 1763; d. Baireuth 14 Nov. 1825. He was educated at Leipsic, and became a tutor and schoolmaster. In 1794 he turned from this to a general literary activity. The prince-primate Dalberg gave him in 1809 an annual pension of 1,000 florins, continued by the king of Bavaria. The fantastic quality of his genius was at first disconcerting, but gradually, says Carlyle, he became considered "not a strange crack-brained mixture of enthusiast and buffoon, but a man of infinite humor, sensibility, force, and penetration." His style is perhaps one of the most barbarous of mediums, and his books are quite without structure. His humor, however, is genuine, though frequently clumsy. He affected boldly to despise all literary proportion and technique, and is recompensed by having the bulk of his work pronounced difficult or unreadable. Yet scattered through his writings are the best of aphorisms and some of the most finely imagined passages in German literature. These may serve to account for the interest Carlyle and De Quincy took in him. Outside of Germany he has not been greatly read, though there are various English renderings of his volumes, such as 'Walt and Vult' by Lee (1846); 'Titan' by Brooks (1863); 'Flower, Fruit, and Thorn Pieces' by Ewing (1877); and 'Levana' by Wood (1887). His first novel, 'Die unsichtbare Loge' ('The Invisible Lodge') appeared in 1793. It was followed by 'Hesperus' (1794); 'Biographische Belustigungen unter der Gehirnschale einer Riesin' ('Biographical Recreations under the Skull of a Giantess,' 1796); 'Leben des Quintus Fixlein' (1796); 'Blumen, Frucht und Dornenstücke' ('Flower, Fruit, and Thorn Pieces,' 1796); 'Der Jubelsenor' ('Parson in Jubilee,' 1797); 'Das Kampaner Thal' (1797); 'Titan' (1800); 'Flegeljahre' (translated by Carlyle, 'Wild Oats,' 1804). The two last are regarded as among his best productions. 'Das heimliche Klaglied der jetzigen Männer' appeared in 1801; 'Dr. Katzenberger's Badereise' (1809); 'Des Feldpredigers Schmelzle Reise nach Flätz' (1809); 'Leben Fibels' (1812); 'Der Komet, oder Nicolaus Markgraf' (1820-2); 'Die Vorschule der Aesthetik,' his first important philosophical work, appeared in 1804, followed by 'Levana, oder Erziehungslehre' (1807), a work on education. Further titles are: 'Friedenspredigt' (1808); 'Dämmerungen für Deutschland' (1809); 'Mars und Phöbus' Thronwechsel im Jahr 1814' (1814); 'Politische Fastenpredigten' (1817). A collection of his works, 'Sämmtliche Werke,' edited by him before his death, was published in 65 volumes (1826-38). 'Der Papierdrache,' his last work, was published in 1845. Consult Spazier, 'Jean Paul Friedrich Richter, ein biographisches Commentar zu dessen Werken' (1833); Carlyle's two essays on Richter; Förster, 'Derkwürdigkeiten

aus dem Leben Richters' (1863); and Nerrlich, 'Jean Paul und seine Zeitgenossen' (1889).

Richthofen, rīht'hōf-ən, Ferdinand, BARON VON, German geologist: b. Carlsruhe 5 May 1833; d. Berlin 7 Oct. 1905. He was educated at the universities of Breslau and Berlin; and went to Austria in 1856 to study the geology of Tyrol, Siebenbürgen and northern Hungary. In 1860 he joined a Prussian expedition to the East and spent 12 years in China, Japan, Siam, Java, the Philippine Islands, Formosa, California, and Nevada. Returning to Europe in 1872 he accepted professorships at Bonn, Leipsic, and Berlin, successively. He published 'China, Ergebnisse eigener Reisen und darauf gegründeter Studien' (1877-83), and the following which have appeared in English: 'The Comstock Lode' (1865); 'Principles of the Natural System of Volcanic Rocks' (1867); 'Letters to the Shanghai Chamber of Commerce' (1869-72).

Rich'wood, Ohio, village in Union County; on the Erie railroad; 34 miles northwest of Columbus. It was settled in 1832, and its growth during the first 30 years was slow; since 1870 it has become the second town of the county in size and importance. It is the centre of an agricultural region; contains flour and planing mills, tile mills, and several large grain elevators, and has a considerable trade. It has a public high school with a school library. Pop. (1910) 1,782.

Ricimer, rīś'ī-mēr, Roman general of the 5th century A.D.; d. 472. He was a barbarian, and received his training under Aëtius. For a long time he was "kingmaker" in the West. He deposed Avitus, and elevated successively Flavius Anitus (454-6), Majorianus (457-61), Libius Severus (461). After Libius' death, he himself ruled for a time as Patricius, until in 467 the danger of a Vandal invasion compelled an alliance of East and West, and the elevation of Procopius Anthemius. Ricimer later grew openly hostile to the monarch, whom he murdered 11 July 472 during a sack of Rome. He then made Olybrius emperor, and died soon afterward.

Richards, rīk'ardz, Marcus Samuel Cam, English poet and naturalist: b. Exeter 28 April 1840. He was educated at Oxford, admitted a solicitor in 1862, and practised for many years in Bristol. In 1876 he took priest's orders in the English Church, was curate of Holy Trinity at Clifton, near Bristol, till 1889, and since that date has been vicar of Twigworth, Gloucestershire. Among his many published works, mainly in verse, are: 'Creation's Hope' (1890); 'Poems of Life and Death' (1895); 'Poems of a Naturalist' (1896); 'Musings and Melodies' (1902).

Rickets, a disease of children in which there is an affection of the general nutrition of the whole body, dependent chiefly upon improper feeding and want of fresh air and exercise. The disease commonly appears after the age of nine months and before that of two years, producing its most obvious effects on the growth of the bones. It is characterized by enlargement of the head, prominent forehead, projecting breast-bone, flattened ribs, big belly, and emaciated limbs, with great debility. The bones and spine of the back are variously distorted. Nature fre-

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quently restores the general health, and leaves the limbs in a state of distortion. In the treatment of rickets tonic medicines, the cold bath, etc., are beneficial. The child should be kept clean and dry, regularly exercised, and allowed to enjoy a pure bracing air, that of the seaside being specially beneficial. The food should be nutritious and easily digestible.

Ricketson, rik'et-són, **Walton**, American sculptor: b. New Bedford, Mass., 27 May 1839. He took up sculpture in 1870, and has since produced portrait busts of Bronson Alcott, Louisa M. Alcott, Thoreau, and George William Curtis, besides intaglios and bas-reliefs.

Ricketts, rik'ets, **James Brewerton**, American military officer: b. New York 21 June 1817; d. Washington, D. C., 22 Sept. 1887. He was graduated from West Point in 1839, served in the Mexican War, where he was engaged at Monterey and at Buena Vista, was promoted captain in 1853, and fought in the Seminole War in Florida. He afterward served on the Texas frontier until the outbreak of the Civil War, when he assisted in the defense of Washington and the capture of Alexandria. He participated in the first battle of Bull Run, and was brevetted lieutenant-colonel and brigadier-general of volunteers. He commanded a division at Chantilly, South Mountain, and Antietam, in 1863 he received promotion as major of artillery in the regular army, was in command of a division in the Richmond campaign, and fought in the engagements from the battles of the Wilderness to the investment of Petersburg. In 1864 he served under Sheridan in the pursuit of Early's army. He was brevetted major-general in the regular army in 1865, and in 1865-6 was in command of a district in Virginia. He was mustered out of the volunteer service in 1866, and in 1867 retired from active duty.

Rickman, rik'man, **Thomas**, English architect: b. Maidenhead, Berkshire, 1776; d. March 1841. He developed a taste for architectural drawing, and having sent in a design for a church that proved successful in a government competition, he settled at Birmingham as an architect. He built a number of Gothic churches and chapels in Birmingham; Hampton, Lucy, Bristol, Preston, Carlisle, etc., many country houses, and the new buildings of St. John's College, Cambridge. He is the author of 'Attempt to Discriminate the Styles of Architecture in England from the Conquest to the Reformation' (1817).

Rico, rē'kō, Colo., town, county-seat of Dolores County; on the Rio Grande Southern railroad; 140 miles southwest of Leadville. The first settlement was made in 1867 and a new settlement in 1877, both by mining prospectors; the town was incorporated in 1879, and became the county-seat on the organization of the county in 1881. It is in a region rich in gold, silver, copper, and iron, and the chief industry is the mining and milling of these ores. The town contains a bank with a capital of \$50,000; and the county court-house. It has a graded public school. The government is vested in a mayor, elected annually, and a council of six members, three elected each year. Population in 1910, 1,208.

GEORGE H. HUTT,
Editor 'Rico News.'

Ricord, rē-kór, **Philippe**, French physician: b. Baltimore, Md., 10 Dec. 1800; d. Paris, France, 22 Oct. 1889. He went to Paris in 1820, where he was granted his medical degree in 1826, practised in the provinces for two years, and on his return to Paris passed the Concours examination, and was appointed a surgeon at the Pitié Hospital. In 1831 his lectures in surgery secured his appointment as surgeon-in-chief at Hôpital des Veneriens du Midi, an office he continued to fill until 1860, when he resigned and engaged in private practice. In 1862 he was appointed physician in ordinary to Prince Napoleon, and in 1869 consulting surgeon to Napoleon III. He was made commander of the Legion of Honor in 1860, and for his services in the ambulance corps during the siege of Paris was made grand-officer of the Legion in 1871. He was the author of various valuable surgical treatises, and invented several surgical instruments.

Riddell, rīd-dēl' or rīd'l, **Charlotte Eliza Lawson Cowan**, English novelist: b. 30 Sept. 1832. She was the daughter of a high sheriff of Carrickfergus, Ireland, and was married to J. H. Riddell of Staffordshire in 1857. Her earliest novel was 'The Ruling Passion' (1858); and among her many later fictions are 'George Geith,' one of her best known works (1865); 'Maxwell Drewitt' (1865); 'Far Above Rubies' (1868); 'The Senior Partner' (1881); 'The Head of the Firm' (1892); 'A Rich Man's Daughter' (1897). Her stories are well constructed, wholesome tales, and have been popular in this country as well as in England.

Riddell, Mrs. J. H. See RIDDELL, CHARLOTTE ELIZA LAWSON COWAN.

Riddle, rīd'l, **Matthew Brown**, American theologian: b. Pittsburg, Pa., 17 Oct. 1836. He was graduated from Jefferson College, Pa., in 1852, and from the New Brunswick Theological Seminary in 1859. He was adjunct professor of Greek at Jefferson College in 1857-8, was pastor of the Dutch Reformed Church, Hoboken, N. J., 1861-5, and of the Second Reformed Church, Newark, N. J., 1865-9. In 1871-87 he occupied the chair of New Testament exegesis at Hartford Theological Seminary, Conn., and since 1887 has filled that chair at the Western Theological Seminary, Allegheny, Pa. He was a member of the American Committee for New Testament revision, an editor of the Standard edition of the Revised Version, and was a revising editor on the Standard American Revised Version of the New Testament (1901). He was one of the editors of Lange's 'Commentary'; 'International Commentary'; 'International Revision Commentary'; and Myer's 'Commentary'; edited Robinson's 'Greek Harmony of the Gospels' (1885); Vols. VII., VIII., 'Ante-Nicene Fathers' and Vols. VI., X., 'Nicene and Post-Nicene Fathers' (1886).

Riddle, any sentence or composition with a double or veiled meaning, which is propounded with a view to the discovery of that meaning, which is designedly obscured by the terms of the riddle. A riddle may either have an apparent sense which serves as a disguise to the real one, or it may be in the form of a question, the terms of which do not directly indicate the na-

ture of the answer required. Riddles naturally divide themselves into two classes: plays upon words, which are otherwise called conundrums; and allegorical or fanciful descriptions of or allusions to the subject on which the riddle is founded. The latter is called an enigma. It is the more ancient and serious form of the riddle. Enigmas, or dark sayings, were frequently used by the ancients to disguise important truths, which it was not deemed safe or advisable that every one should know. Kings sent enigmas to each other, ambassadors delivered their messages in this form, and the oracles of the gods were frequently conveyed in the form of an enigma. In modern times serious enigmas have been elaborated in prose and verse, particularly the latter, in all civilized languages. They are in general mere elaborate trifling, and are commonly as dull as they deserve to be.

Among the most celebrated examples of ancient riddles is that propounded by the Sphinx, and answered by Oedipus, What animal is that which goes on four feet in the morning, on two at midday, and on three in the evening? The answer is Man, because he goes on all fours as a child, on two feet as a young man, and with a staff in old age. The punning variety of riddle, though sometimes indulged in by the Greeks and Romans, is comparatively of modern growth. It is a great favorite in festive gatherings of juveniles. Sometimes strings of puns are linked together with considerable ingenuity in the more complex riddles of this description, as in the following instance: What wind does a hungry sailor like best? One that blows fowl and chops, and then comes in little puffs. The earliest collection of riddles known to have been published is entitled 'Demands Joyous,' printed in 1511. The first French collection was published in Paris by Gille Beys in 1582. See also ENIGMA.

Rideau (rê-dô') Canal, a Canadian canal constructed between Kingston on Lake Ontario and Ottawa as a through waterway by means of the River Ottawa to Montreal, the Saint Lawrence route being interrupted by rapids. Canals have since been built along the Saint Lawrence to avoid these, and the Rideau is now little used.

Rideing, rid'ing, **William Henry**, American editor: b. Liverpool, England, 17 Feb. 1853. He came to the United States and lived in Chicago until 1870, after which he was engaged in journalism in various American cities. Since 1881 he has been associate editor of the 'Youth's Companion,' and in 1887-99 was associate editor of the 'North American Review.' He has published: 'Scenery of Pacific Railways' (1878); 'Thackeray's London' (1885); 'In the Land of Lorna Doone' (1895); 'At Hawarden with Mr. Gladstone' (1896); 'How Tyson Came Home' (1904); etc.

Riders, in national or state legislation, the additional provisions of a bill under the consideration of a legislative assembly, having little connection with the subject-matter of the bill. Sometimes riders are attached to important bills, in order to gain the chance of passage, since by themselves they are likely to incur an executive veto, but as a part or proviso of an important bill they are absorbed in the main subject, and so dodge the "veto" and the "table." It has been proposed frequently that the Constitution of the United States be so amended that the

President could veto single objectionable items, without affecting the main purpose of bills.

Ridge, ridj, **Major**, Cherokee chief: b. Highwassee, present State of Georgia, about 1771; d. Cherokee reservation 22 June 1839. He became a councillor and one of the leaders of the Cherokee nation. He favored the deportation of the Cherokees from the Georgia reservation to one westward of the Mississippi, and was murdered, presumably, by some of the opposing party.

Ridge, **William Pett**, English novelist: b. Chartham, Kent. He was educated at the Birbeck Institute in London. He began to write in 1890, and among his published works are: 'The Second Opportunity of Mr. Staplehurst' (1896); 'A Son of the State' (1889); 'A Breaker of Laws' (1900); 'Outside the Radius' (1900); 'Lost Property' (1902).

Ridgefield, ridj'fēld, Conn., town in Fairfield County; on the New York, New Haven & Hartford railroad; about 60 miles northwest of New York, and 13 miles north by west of Norwalk. It is in an agricultural region, and is a favorite resort for residents of New York. The chief industries which contribute to the prosperity of the town are farming, dairying, the grinding of feldspar, and the manufacturing of ice-cutting tools. The most prominent public building is the public library, presented to the town by James Morris of New York, in memory of his wife, Elizabeth W. Morris. There are four churches, good public schools, and one private school. The National Bank has \$25,000 capital; the savings bank has \$592,268.52 deposits. The government is administrated by a board consisting of a warden and burgesses, six members, elected annually in May. Pop. (1900) 2,626; (1910) 3,118.

W. A. WHITE,
Editor 'Ridgefield Press.'

Ridge'town, Canada, town in the County of Elgin, Province of Ontario; on the Michigan Central railroad; about eight miles from Lake Erie and 65 miles east of Windsor. It is in an agricultural region, and has some manufacturing interests.

Ridgeville, ridj'vil, Ind., town in Randolph County; on the Mississinewa River, and on the Pittsburg, C., C. & St. L. and the Grand Rapids & Indiana R.R.'s.; about 60 miles south of Fort Wayne, and 90 miles northeast of Indianapolis. It is in a fertile agricultural region, and is the trade centre for the northern part of the county. It has several industries connected chiefly with farm products and stock raising. It has good public schools, several private schools, and a public library. Pop. (1910) 1,178.

Ridge'wood, N. J., village in Bergen County; on the Erie railroad; about 22 miles north of New York. The railroad divides the village into eastern and western sections. The village is in a residential locality; the western side is built up with fine residences, most of them the homes of men doing business in the city. The eastern section of the village spreads out into the Paramus Valley, through which flows the Saddle River. In this part are substantial dwellings with extensive grounds. There are no manufactories. The business blocks and fraternal society buildings are mostly of limestone and pressed brick.

There are nine churches, public schools, and one private school for boys. Located here is the House of Divine Providence for Incurable Patients, in charge of Sisters of Charity. The water supply is obtained from artesian wells. The roads in the vicinity are excellent, and the scenery in general, together with the numerous groves and small streams, make it a most charming locality. In the vicinity are many points of historic interest, their histories dating back to pre-Revolutionary days. Pop. (1890) 1,047; (1900) 2,685; (1910) 5,416.

Ridgway, ridj'wā, Robert, American naturalist: b. Mount Carmel, Ill., 2 July 1850. He was zoologist to the United States geological exploration of the fortieth parallel under Clarence King in 1867-9, and since 1880 has been curator of the division of birds in the National Museum at Washington. He was one of the founders in 1883 of the American Ornithologists' Union, of which he later became president. He served as a member of the committee at the first International Ornithological Congress at Vienna in 1885, and of that at Budapest in 1901. He is author of: 'A Nomenclature of Colors for Naturalists' (1886); 'Manual of North American Birds' (1887); 'Birds of North and Middle America' (1901-2); etc.

Ridgway, Pa., borough, capital of Elk County; on the Clarion River, and on the Buffalo, R. & P. and the Pennsylvania R.R.'s; about 150 miles northeast of Pittsburgh and 115 miles southeast of Erie. It is in a region devoted mainly to lumbering and agriculture. The chief industrial establishments are lumber mills, sash, door, and blind factories, flour and grist mills, machine shops, engine and boiler works, and dry kilns. There are other manufactories whose products are mining materials, proprietary medicines, and tobacco products. The educational institutions are public and parish elementary schools, a public library, and a private business school. Pop. (1910) 5,408.

Riding and Driving. See HORSES, RIDING AND DRIVING.

Ridley, rid'li, Nicholas, English ecclesiastic and martyr: b. about 1500; d. Oxford 16 Oct. 1555. He was graduated from Cambridge in 1521-2, later studied at the Sorbonne, Paris, and at the University of Louvain. Returning to Cambridge as proctor to the university, as such he advocated the claims of King Henry VIII. to the supreme ecclesiastical jurisdiction in the realm. Through the patronage of Archbishop Cranmer he became one of the king's chaplains; in 1540 he became master of Pembroke Hall, in 1541 canon of Canterbury, and in 1545 an additional canonry of Westminster was conferred upon him. In 1547 he was elevated to the see of Rochester. In 1550, on the deprivation of Bonner, Ridley was made bishop of London, and distinguished himself by his tempered zeal in favor of Protestantism, and especially by his liberality and kindness toward the family of his predecessor. In 1553 in a sermon before Edward VI. he made an appeal for the destitute London poor, and as a result of subsequent conferences the king and corporation of London determined to build Christ's Hospital, St. Thomas' Hospital, and Bethlehem Hospital. On the death of Edward he was induced to listen to those who

attempted to secure the Protestant ascendancy by placing the Lady Jane Grey upon the throne. The defeat of this scheme, the active part he had taken in the establishment in the new discipline and the construction of the liturgy, together with his connection with Cranmer, marked Ridley out as one of the most prominent opponents of Queen Mary. He was arrested and sent to the Tower 20 July 1553. In the spring of 1554 he was removed to Oxford, and being brought before the royal commissioners and refusing to recant he was excommunicated. His further trial progressed slowly. The next year parliament passed penal laws against heretics and under these he was summoned to trial. His condemnation followed upon his admitting the truth of the principal charges against him, and he was burnt at the stake in company with Hugh Latimer.

Rid'path, John Clark, American educator and historian: b. Putnam County, Indiana, 26 April 1840; d. New York 1 Aug. 1900. He was graduated from Asbury University, Indiana, in 1863, and in 1864 was appointed principal of the academy at Thornton, Ind. In 1866 he was superintendent of public instruction for Lawrenceburg, Ind., and in 1867-9 professor of languages at Baker University, Baldwin City, Kan. In 1869 he was appointed to the chair of English at Asbury, and in 1879 became vice-president of the university. The endowment of \$2,000,000 bestowed upon the university by Mr. De Pauw, was secured largely through Ridpath's efforts, and under his management it received its new name of De Pauw. After his resignation from the university he devoted himself to literature. He was one of the editors of the 'People's Cyclopædia' (1881), and published 'Academic History of the United States' (1874-5); 'Popular History of the United States' (1877); 'Life of James A. Garfield' (1882); 'Cyclopædia of Universal History' (1880-4); 'Great Races of Mankind' (1893); 'Life and Times of Gladstone' (1898); 'History of the United States' (1900); etc.

Riedesel, rê'dê-zêl, Frederica Charlotte Louisa (VON MASSOW): b. Brandenburg 1746; d. Berlin 29 March 1808. She was the wife of Baron Riedesel (q.v.), and accompanied her husband to America. After Burgoyne's surrender she resided for a year at Cambridge, Mass., where a street has since been named in her honor; and later at Charlottesville, Va. She wrote graphic descriptions of the campaign and subsequent events, published after her death by her son-in-law, Count von Reuss, and translated inadequately into English in 1827 ('Letters and Memoirs Relating to the War of American Independence, and the Capture of the British Troops at Saratoga'), and worthily by W. L. Stone in 1867 ('Letters and Journals Relating to the War of the American Revolution').

Riedesel, Friedrich Adolph, FREIHERR ZU EISENBACH, German soldier: b. Lauterbach, Rhine Hesse, 3 June 1738; d. Brunswick 6 Jan. 1800. He studied at the Marburg law school, but before the completion of his course enlisted in a regiment of Hessian infantry as vice-ensign, and soon afterward went to England with his regiment, which had been made part of the British army, and was billeted on a town near London. There he became fairly pro-

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ficient in English. On the outbreak of the Seven Years' war in 1756, the regiment was summoned to Germany, and Riedesel was assigned to the immediate staff of Duke Ferdinand of Brunswick. Shortly after the outbreak of the American Revolution, England negotiated with several of the petty sovereigns of Germany for some 20,000 troops. Of these about 4,000 were from Brunswick. Riedesel was promoted major-general and placed in command of the Brunswick contingent, and on 1 June 1776 he reached Quebec. A thorough disciplinarian, he practised his troops in the American mode of fighting, particularly in rapidity of firing, in which the Continentals were much more efficient. He accompanied Burgoyne (q.v.) on the ill-fated expedition of 1777, distinguished himself at Ti-conderoga, and at Hubbardton brought up reinforcements and dispersed the Americans. At Freeman's Farm 19 Sept. 1777, he saved the British from rout by arriving with his Brunswickers; and, after the action on 7 October, had his counsels prevailed, Burgoyne would probably have made a successful retreat to Canada. He was taken prisoner at Saratoga 17 October, exchanged in 1779, and in that year appointed to a command on Long Island. In 1783 he returned to Germany, in 1787 was promoted lieutenant-general, and in 1788 commanded the Brunswick portion of the army sent from Germany to Holland to assist the Stadtholder. From 1794 until his death he was commandant of the town of Brunswick. The 'Leben und Wirken des General-Lieutenants F. A. Riedesel, nebst vielen Original-Correspondenzen und historischen Aktenstücken,' by von Eelking, appeared in 1856. An abridged translation into English by W. L. Stone was published in 1868. It affords a most complete and accurate account of Burgoyne's expedition, as well as a clear view of contemporary affairs in Canada.

Riel, rê-êl', Louis, Canadian insurgent: b. St. Boniface, Manitoba, 23 Oct. 1844; d. Regina, Northwest Territory, 16 Nov. 1885. He belonged to the Mitis race of Franco-Indians, and as protégé of Archbishop Taché, was educated at the Jesuit College at Montreal. In 1869 he took part in the protest raised by the native tribes against the establishment of Canadian authority in the territories lately acquired from the Hudson Bay Company, and was elected president of a provisional government established at Fort Garry. The rebellion was suppressed the next year by a force under Sir Garnet Wolseley and Riel fled from the territory. In 1873 he was elected to the Dominion parliament for Provencher, but was not permitted to take his seat, and after two subsequent re-elections a warrant of outlawry was issued against him and he was sentenced in 1875 to five years' banishment with forfeiture of political rights. In 1884-5 he headed a party of half-breeds in another insurrection, which was soon suppressed. Riel was taken prisoner, convicted of treason, and executed. See **RIEL'S REBELLION**.

Riel's Rebellion, or the Northwest Rebellion, was an outbreak of the half-breeds and Indians of the valley of the Saskatchewan, in the spring of 1885, promptly suppressed by the Canadian militia. For some time past discontent had been rife among the half-breeds, or metis, of that district, who feared that the surveying of the

country by the Dominion government and the government sales of land to incoming settlers would dispossess them of their homesteads. In June 1884 Louis Riel, the half-breed leader of the abortive outbreak of 1869-70, returned by invitation from Montana and put himself at the head of the movement. At a gathering at Saint Laurent, on the Saskatchewan, September 1884, a "Bill of Rights" was adopted asking that the half-breeds should receive the same grant of 240 acres per capita that had already been given (1870) to their kinsmen in the province of Manitoba. With this demand were coupled more extravagant pretensions to further reservations of land and grants of money. Various petitions had already been sent to the Dominion government in behalf of the half-breed claims. A commission had been appointed to consider them, but the whole matter aroused so little public attention in Canada that the news of the actual revolt in March 1885 came with alarming suddenness. On the 17th of that month the metis formed a provincial government, with Louis Riel (q.v.) as president, Gabriel Dumont as adjutant-general, and a numerous council. All obtainable stores were seized, supplies on the way to Prince Albert intercepted, and the telegraph wires cut. At the same time every effort was made to arouse the Indians of the Saskatchewan district, detachments of whom, under Beardy and One-Arrow, at once joined the rebels. The only forces immediately available to cope with the outbreak were about 500 mounted police, scattered in small detachments over the Northwest Territory, of whom some 200 men of all ranks were distributed between Prince Albert, Fort Carlton, Battleford, and Fort Pitt. The rebels demanded the surrender of Fort Carlton, a mounted police post on the North Saskatchewan, 40 miles above Prince Albert, held by Major Crozier with a handful of men. Crozier refused, and succeeded in communicating with Prince Albert, and obtaining a reinforcement of 40 volunteers. With the help of these he attempted (26 March) to secure the stores from Duck Lake, a post a few miles distant. Here occurred the first bloodshed of the rising. The rebels attacked Crozier near Duck Lake, and forced him to retire to Carlton with a loss of 12 killed and 12 wounded. The mounted police burned the fort at Carlton and retired to Prince Albert. The news of the fight at Duck Lake occasioned intense excitement throughout Canada. Immediate steps were taken to despatch an adequate force of militia to the northwest. General Sir Frederick Middleton, the commander-in-chief, was already on his way. On the 28th of March there was a general call to arms of the militia forces, picked troops from the different regiments being at once forwarded to the front. Various corps of scouts, rangers, cavalry, etc., were specially organized. Eighteen hundred troops started from Ontario and Quebec within six days of the call to arms, and within a month 3,000 men had been transported to the northwest and 1,500 raised in Manitoba and the territories. The area of operations was the valley of the Saskatchewan River, whose north branch runs from west to east through the district of the same name at a distance of about 200 miles north of the Canadian Pacific Railroad and roughly parallel with its course. On this river were the important posts of Prince Albert, Battleford, sit-

mated about 160 miles farther up the river, and Fort Pitt, also on the river, 120 miles northwest of Battleford. The main body of rebels had established themselves at Batoche, on the South Saskatchewan, a river flowing from the southwest to meet its confluent on a long V-shaped angle. Mustering his forces at Qu'Appelle and Swift Current, Middleton resolved to strike into the rebel territory in two columns. The main column, under Middleton, was to move northward on Clark's Crossing, a ferry station on the Saskatchewan about 40 miles by trail from Batoche. A second, under Lieutenant Colonel Otter, was to march from Swift Current (140 miles west of Qu'Appelle) to the relief of Battleford. A third force, gathered at Calgary, was to descend the route of the North Saskatchewan from Edmonton, thus reaching Fort Pitt. Meantime the position of affairs appeared extremely critical. Some 500 Indians in the neighborhood of Battleford had risen under Poundmaker, a Cree chief, laid siege to the stockade fort in which the whites had taken refuge, and plundered the stores of the town. Near Fort Pitt the Indians had also risen under Big Bear, and at Frog Lake, a post about 30 miles distant, on Good Friday (3 April), they plundered the stores and shot down nine persons in cold blood. The news of the massacre spread terror throughout the unprotected valley of the upper river, the settlers fleeing toward Edmonton. Many of the deserted houses were looted and burned. The advance was carried out with admirable success. The main column, the Royal Grenadiers, A Battery and other troops, traversing in forced marches 177 miles of prairie, struck the South Saskatchewan at Clark's Crossing. Advancing northwards down the river, they came upon the rebels strongly posted in a wooded ravine called Fish Creek, in which they had constructed rifle pits. A sanguinary contest ensued (23 April). The rebels, led by Gabriel Dumont, defended themselves stubbornly, but were ultimately dislodged. The loss of the militia was 10 killed and 40 wounded. The second column, under Otter, consisting chiefly of Queen's Own men, left Swift Current 13 April, and after a march of 202 miles successfully relieved the beleaguered fort at Battleford. From there Colonel Otter determined to strike at Poundmaker's reserve, against which he moved on 1 May, with a force of 325 men and three guns. They came upon the Indians in force at Cut Knife Hill, and after a severe engagement were compelled to retire on Battleford, with a loss of 8 killed and 14 wounded. At the same time General Strange, with the third division, marched from Calgary to Edmonton (2 May), and thence directed his forces against Big Bear. Meanwhile General Middleton decided to move forward against the main body of the half-breeds at Batoche. The advanced season rendered possible the navigation of the South Saskatchewan, down which the steamer Northcote, with supplies and munitions, was despatched to join Middleton's column. Batoche was invested by the militia on 9 May, and a four days' fight ensued. The rebels were entrenched in rifle pits along the banks of the river. During the first three days the fighting was desultory, Middleton using his artillery and throwing up earthworks in order to exhaust the ammunition of the half-breeds without unduly exposing his men. The Northcote, that was to

have aided in the attack, steamed down the river under a hot fire on the 9th, but its steering gear being disabled, it drifted past Batoche. On the fourth day a general charge of the militia resulted in a complete victory. The rifle pits and the village of Batoche were taken by storm and Riel and many of his council captured. Dumont escaped to the United States. The loss of the Canadian forces in the four days was 8 killed and 46 wounded; that of the rebels, 51 killed and 173 wounded. With the storming of Batoche the rebellion was virtually at an end. Poundmaker capitulated, and Big Bear fleeing to the north, though offering fight at Frenchman's Butte and Loon Lake, was ultimately captured (2 July). Riel was taken to Regina, where he was tried for treason-felony (July 1885). His counsel attempted to defend him on the ground of insanity, but the plea was unavailing, and he was sentenced to be hanged. Numerous petitions were sent from French Canada in favor of commutation of his sentence, with equally urgent petitions to the contrary from various parts of the Dominion. He was hanged at Regina 16 Nov. 1885, meeting his death with great fortitude. Eight Indians were shortly afterwards hanged at Battleford for complicity in the murders at Frog Lake, Fort Pitt and other places. Poundmaker, sentenced to three years' imprisonment, died in the Manitoba penitentiary. For further information consult the 'Official Report on the Suppression of the Rebellion,' Ottawa, 1886; 'Dominion Annual Register' (1885); 'Reminiscences Lieut.-Col. Bolton' (1886).

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Rienzi, rē-ĕn'zē, Cola di, Roman popular leader; b. about 1313; d. 8 Oct. 1354. The son of an innkeeper, he became imbued with a passionate desire to re-establish the glory of ancient Rome on the ruins of the oligarchy under whose rule the people suffered. In 1343 he went to the Pope at Avignon, as the representative of the Roman people, and entreated him to return to Rome and end the misrule of the nobles. The Pope made Rienzi apostolic notary, and the latter returned to Rome, where he began the organization of a widespread movement for the overthrow of the aristocracy. On 20 May 1347, Rienzi summoned an assembly of the people at the Capitol, and there proposed a new constitution for the state, providing for the arming of the people and the garrisoning of the walls by them, the reform of justice and the equitable distributing of taxes. He became head of the new republic with the title of Tribune of the People, and by means of the popular levies forced the nobles to leave the city. Rienzi's plans included not merely the restoration of the municipal liberties of Rome, but the re-establishment of the ancient Roman state, and to that end he invited the Italian cities to send representatives to Rome for the consideration of the welfare of Italy. Though few cities responded, Rienzi, carried away by power and his own eloquence, caused himself to be crowned tribune 15 August, and bestowed the Roman citizenship on all inhabitants of Italy. The Pope's hostility, however, was aroused by Rienzi's vainglorious attempt to act as arbitrator in the dispute for the imperial throne that was then in progress, and he stirred up the Roman nobles against Rienzi. The nobles were defeated, but, Rienzi, dazzled by success, began to play the tyrant, and a second insurrection compelled him to flee the city (15

RIENZI—RIG VEDA

December). Later he went to Bohemia to secure the aid of Emperor Charles II. for the execution of his plans. The emperor handed Rienzi over to Pope Innocent VI., who, however, recognized how useful the tribune might be to him in crushing the Roman nobility and therefore sent him to Rome with Cardinal Albornoz in 1354. Rienzi's popularity was still great and he easily regained power; once more, however, he fell a victim to excess, perpetrated acts of outrage and oppression, and aroused the hatred of the people. An insurrection, stirred up by the nobles of the house of Colonna and Sarelli, broke out on 8 Oct. 1354. The mob stormed the Capitol, and Rienzi, seized as he was escaping in disguise, was murdered, and his body dragged through the streets. The career of Rienzi is the subject of one of Bulwer-Lytton's novels, 'Rienzi' (1835) and of Wagner's opera, 'Rienzi,' first produced at Dresden 20 Oct. 1842. Consult: Pappencordt, 'Cola di Rienzo und seine Zeit' (1841); Auriac, 'Etude historique sur Nicolo Rienzo' (1888); Rodocanachi, 'Cola di Rienzi' (1888).

Rienzi, The Last of the Roman Tribunes, a historical romance by Sir Edward Bulwer-Lytton, published in 1835. It is founded on the career of Cola di Rienzi (q.v.). Bulwer was so impressed with the heroism and force of character of his hero, that at first he meditated writing his biography, instead of a romance founded on his life. The story adheres very closely to the historical facts. Many of the situations and scenes are very strong. The treatment is epic rather than dramatic; and the splendid yet comfortless civilization of the Middle Ages, so picturesque and so squalid, so ecstatic and so base, is vividly delineated. Rienzi is also the subject of a once popular tragedy by Mary Russell Mitford, first published in 1828.

Riesengebirge, rē'zēn - gē - bē'r'gē (the Giants' Mountains), part of the Sudetic chain, separating Silesia from Bohemia and Moravia, till it joins the Carpathians. It contains the loftiest mountains of the north or central parts of Germany. Some of the principal summits are Schneekoppe, 5,257 feet high; the Borenberg and the Grand Rad, each 5,156 feet high.

Riet-bok, rēt'bōk, the Dutch name of a South African species of antelope, *Antelope* (or *Tragelaphus*) *arundinaceus*. It is nearly five feet in length and about three feet high at the shoulder; the horns, about a foot long, are boldly annulated at the base. In color it is of a dull ashy gray, sometimes tinged with red on the upper parts and silvery-gray beneath. As its name (*riet-bok*, reed-buck) implies, it is found mostly among reeds or coarse long grass.

Riff, a name given to the coast districts of northern Morocco extending from Ceuta to the western frontier of Algiers, and forming a line of steep cliffs with few harbors. Its Berber inhabitants were formerly much addicted to piracy, and are still noted for smuggling.

Rifle. See SMALL ARMS.

Rifleman, or **Rifle Bird**, an Australian forest-bird (*Philorhis paradiseus*), closely related to the birds of paradise and so called because its colors and ornaments reminded the colonists of the old uniform of the British Rifle Brigade. The male is regarded as more splen-

did in plumage than any other Australian bird. The upper parts are velvety black, tinged with purple; the under parts velvety black, diversified with olive-green. The crown of the head and the throat are covered with innumerable little specks of emerald green of most brilliant lustre. The tail is black, the two central feathers rich metallic green. The female, as is often the case, is much duller colored than her mate. They obtain their insect food largely from beneath the loose bark of trees, about which they scramble like woodpeckers. Consult Newton, 'Dictionary of Birds' (1893-6).

Riffing. See ORDNANCE.

Rig Veda, rīg vā'dā, the oldest of the four Vedas, and therefore the oldest literary monument of the Indo-European races. The term Veda is the ancient Hindu Sanskrit word for knowledge, and the Vedas compose the great body of sacred scripture of the older Hindus, written in an ancient form of Sanskrit. The precise time of composition of the Vedas can not be determined, but it is probable that the Rig Veda was in course of composition as early as 1200 B.C., and some authorities contend that some of the verses must have been composed as early as 1500 B.C., the latest date of composition given for any of the verses being 600 B.C. It is known that the Rig Veda was composed by many different generations, and Max Müller believes that for a long period after its composition it was transmitted orally from one to another, and that it was not set down in writing until a much later date, since it contains no allusion to writing or writing materials. Of the four Vedas the Rig Veda is by far the most important, not only on account of its greater antiquity but also because of the information which it contains. The most authoritative writers state that the sacred hymns of the Rig Veda are repeated in a modified form in the Sāma Veda, or chants, and in another form in the Yajur Veda, or ritual, while the fourth and latest of the Vedas, the inferior Atharva Veda, shows great modifications from the hymns of the Rig Veda, due to the introduction of superstitions, magic chants and vulgar charms. The hymns of the Rig Veda, in common with those of the three succeeding ones, are of four classes; the first and most important are the mantras, or sacred utterances, usually in metrical form; the next are the Brahmanas, or explanatory inspired utterances, being the oldest Indo-European bodies of prose; last come the Sutras, or rules of the sacrifice. The Rig Veda consists of 1,017 hymns or short lyric poems, with 10,580 verses. It is written in ten books, of which books ii.-viii. contain each the record of a single family or clan; book i., 15 collections, each attributed to a different poet-sage; book ix. glorifies the sacred drink "Soma," and book x. contains hymns supposed to have been composed by many different authors. The religion was nature worship, the chief objects of adoration being Agni, the god of fire, and Indra or Jupiter Pluvius, the cloud-compeller. The Hindu Triad had not yet arisen. The Rig Veda does not recognize the institution of caste. Beef was eaten. Women held a high position, and some of the hymns were composed by them. The rite of suttee was unknown; the conquest of Indra had

only begun, and the Ganges, incidentally mentioned, had not become a sacred stream. "The home of the Rig Veda," says Prof. Hopkins, of Yale University, "has been located in almost as many places as Paradise. Now it is by the Caspian Sea, now it is in Kandahar, but the Punjab is the favorite place, and quite naturally; for the poets are familiar with the Punjab, sing of it, talk of crossing its rivers, and in many ways show that they occupied, in part at least, the country stretching from Peshawar to Delhi." (See *SANSKRIT LITERATURE; VEDA.*) Consult: 'India Old and New: The Rig Veda,' by E. W. Hopkins (New York 1901); 'The Religions of India,' by the same author (Boston, 1895); and the translation by Arrowsmith (Boston, 1886) of A. Kaegi's 'Rigveda.'

Riga, *rē'gā*, Russia, capital of Livonia on the Dwina, seven miles from the Gulf of Riga, an inlet of the Baltic, is one of the principal seaports of the empire and ranks in trade next to Saint Petersburg and Odessa. Of the four parts into which it is divided, the old town alone preserves the Hanseatic features. It is characterized by high storehouses and spacious granaries; market place; other squares, and busy, winding streets. The Saint Petersburg division of the town is the aristocratic quarter. The "Domkirche" (1204) contains one of the largest organs in the world. Saint Peter's Church has a tower 400 feet high. The Castle (1404-1515), built by Walter von Plettenberg, is a spacious building now occupied by the military authorities. Other places of more recent construction are: The Polytechnic, Exchange, municipal picture gallery, schools, gymnasiums and scientific and professional colleges, bonded warehouses and manufactories. At least half of the population is German, the German element predominating in the life of the city. There is an ever-increasing intellectual and commercial development. Riga is a great mart for timber from the vast White Forest, and the third city of Russia for exports, the chief of which are corn, hemp, oats, tallow, leather, tobacco, rugs, and feathers. Much of the interior trade is carried on by both rail and water communications.

Riga, Gulf of, Russia, an inlet on the east side of the Baltic Sea, 105 miles in length from north to south and about 60 in breadth. The islands of Ösel, Dagö, Mohn, and Worms, lie across the entrance. The chief river which falls into the gulf is the Dwina; seven miles above its mouth is the important commercial seaport of Riga (q.v.), after which the gulf is named.

Rigaud, rē-gō, Hyacinthe, French painter: b. Perpignan 20 July 1659; d. Paris 27 Dec. 1743. He arrived at Paris in 1681 and, acting under the advice of Lebrun, began to study portrait painting, taking Van Dyck for his model. In 1700 he became a member of the Academy, of which he was elected Professor in 1710 and Rector in 1733. His portraits are all extraordinarily successful as likenesses, his heads are full of character, and the figures have all the studied nobleness in attitude characteristic of the times; while he paints the gay costumes of the court with remarkable truthfulness and brilliancy. Among his most notable works in

the Louvre are the large portraits of Louis XIV. and Bossuet, of which latter a replica or copy is to be found in the episcopal palace at Meaux.

Rig'don, Sidney, Mormon leader: b. Allegheny County, Pa., 19 Feb. 1793; d. Friendship, N. Y., 14 July 1876. He was employed in a printing office in Pittsburg in 1812 when a manuscript entitled 'The Manuscript Found, or the Book of Mormon' was offered for publication by Samuel Spaulding (q.v.). The work impressed Rigdon so much that he made a copy of the manuscript before it was returned to the author who died soon after. In 1819 Rigdon became a Baptist preacher and in 1829 made the acquaintance of Joseph Smith, with whom (according to a story denied by the Mormons) he published 'The Book of Mormon,' transforming it by the addition of various pious phrases from an innocent historical romance into a new bible intended as the foundation of a new sect. He accompanied Smith to the West, assisted in founding the Mormon Church and became one of its presidents. He was one of the originators of the "new revelation" authorizing polygamy, and in 1844 on the death of Smith aspired to the leadership. He refused to acknowledge the authority of Brigham Young, was excommunicated, and returned to the East where he lived quietly until his death.

Rigg, James Harrison, English Wesleyan clergyman and educator: b. Newcastle-on-Tyne 16 Jan. 1821. He was educated at Kingswood School and in 1845 entered the Wesleyan ministry. He was a member of the London school board 1870-6; principal of the Westminster Training College 1868-1903; and a member of the Royal Commission on Education 1886-8. He edited the 'Quarterly Review' for 15 years and wrote: 'Principles of Wesleyan Methodism' (1850-1); 'The Churchmanship of John Wesley' (1868-78-86); 'Dr. Pusey: His Character and Life-work' (1883); 'Scenes and Studies in the Ministry of Our Lord' (1902); etc.

Riggs, rigz, Elias, American missionary and linguist: b. New Providence, N. J., 10 Nov. 1810; d. Scutari, Turkey, 17 Jan. 1901. He was graduated from Amherst in 1829, from Andover Theological Seminary in 1832, was ordained to the ministry and sailed for Greece as a missionary in the same year. He continued his work in Greece from 1832-8, in Smyrna from 1838-53, and from that time was engaged in Turkey. He returned to the United States once, in 1856, for the purpose of publishing his Armenian Bible, and while waiting for the completion of the work taught Hebrew in Union Theological Seminary in 1857-8. The remainder of his life was spent in Turkey. He translated the Bible into Bulgarian, Armenian, and Turkish, and published: 'Manual of the Chaldee Language' (1832); 'Grammar of the Modern Armenian Language' (1847); 'Grammar of the Turkish Language as Written in the Armenian Character' (1856); 'Notes on Difficult Passages in the New Testament' (1889); etc.

Riggs, John Davis Seaton, American educator: b. Washington, Pa., 29 Jan. 1851. He was graduated from the University of Chicago in 1878, after engaging in business in Rockford,

Ill., in 1869-75. He was principal of the commercial department in Salt Lake Academy, Utah, in 1878-9, of the preparatory department in the old University of Chicago in 1879-86, and joint principal of University Academy, Chicago, in 1886-7. In 1887 he organized the Granville (now Doane) Academy of Denison University, Ohio, and was its principal until 1896, since when he has been president of Ottawa University, Kansas. He has published: 'In Latinum' (Cæsar) (1890); 'In Latinum' (Cicero) (1892); etc.

Riggs, Kate Douglas (Smith) (Wiggin), American author: b. Philadelphia 28 Sept. 1857. She was graduated at Abbott Academy (Andover, Mass.) in 1878; was the first to organize free kindergartens for the poor of the Pacific coast. She was married to G. C. Riggs in 1895, but continues to use the name "Kate Douglas Wiggin" as a literary signature. Her reputation as a humorist was made by the sketch 'The Birds' Christmas Carol' (1888), and has been well sustained by the cleverness in description and dialogue of her succeeding volumes, among them: 'The Story of Patsy' (1889); 'Timothy's Quest' (1890); 'Polly Oliver's Problem' (1893); 'Marm Lisa' (1896); 'Penelope's Progress' (1898); 'Penelope's Experiences in Ireland' (1901); and 'The Diary of a Goose Girl' (1902). She also edited the anthology 'Golden Numbers' (with N. A. Smith, 1902).

Righi, ré'gi. See RIGL.

Right is a claim or a title to anything whatever that can be enforced, or a claim to act, possess, or enjoy anything, or the use thereof, or it may exist in the nature of a privilege or power. Right has also been legally defined "as that which one has a legal claim to do; legal power; authority, immunity granted by authority." A legal right is one which is protected by law, and the means of protection is the remedy. The existence of a legal right implies the existence of legal remedy, for one does not exist without the other.

Right-handedness, the property or condition of being right-handed. The propensity in man to use the right hand in preference to the left is generally attributed to the lack of perfect symmetry in the body. If the body could be folded over from a medial line so that each organ of the one side should lie exactly on a corresponding organ of the other, the bodily structure would be highly fitted, in a mechanical sense, for the equal use of either limb, and ambidextral individuals would be the rule. The centre of gravity in the body is a little to the right of such a medial line. This makes the right side the heavier. From a series of experiments the greater weight has been estimated at about 15 ounces. On this fact is founded the mechanical theory of right-handedness, the predominance of the right hand over the left; or, more generally, of the limbs of the right side over those of the left. The three-lobed right lung is more capacious and receives more air during an inspiration than the two-lobed left lung. The liver during inspiration swings toward the right side, shifting the centre of gravity farther to that side. In violent muscular exertion there is more air proportionally inhaled by the lung of the side which

sustains the exertion. Under exertion of the right side the larger lung is better filled than the smaller, and the centre of gravity is removed till it is found in a line passing through the right foot; so that the right leg and foot afford a steadier basis of support than the left would do under similar circumstances. Through the greater use of the right lower limb the right upper limb comes to be preferred. In the case of a light weight, slung on the arm, the equilibrium of the body is better maintained by carrying it on the left side. If the weight be a heavy one, borne on the left shoulder, the burden is really being supported very much by the right limb, owing to the natural curve of the body toward the right side, while sustaining the pressure.

In a very few cases left-handedness has been found to accompany transposition of the viscera. But cases of genuine left-handedness far exceed in number such instances of transposition. Ferrier's researches have proved that when we see with the right eye we see with the left side of the brain. Hereditary left-handedness may be due to the greater development of the right side of the brain. "It is practically certain," says Bastian, "that the great preponderance of right-handed movements in ordinary individuals must tend to produce a more complex organization of the left than the right hemisphere."

In the evolution of man right-handedness has probably been a late acquisition. The oldest discovered records of the human race, however, prove man to have been right-handed. Prehistoric weapons are those of right-handed individuals. Nearly all tools, etc., now in use are made for the right hand.

Right-handedness in man appears to be more persistent than the corresponding quality in lower animals. Naturalists, who observe that adult monkeys catch nuts more with the right hand, that the African elephant digs more with the right tusk, or that the Carolina parrot has a preferential claw for grasping, tell us that these habits are subject to exceptions more numerous than those of left-handedness in human beings.

Right of Way, the right to pass over a certain route or track in going from one place to another. Such a right is a public right of way if enjoyed by everybody; private if enjoyed by a certain person or description of persons (as the residents of a particular farm). Wherever there is a public right of way there is technically a highway, though the phrase is not used in connection with regularly-kept-up public roads, but generally with mere paths, tracts, or by-roads. The origin of a public right of way is generally said to be by dedication of it to the public by the owner of the soil.

Right Whale, the most important of the baleen whales. See WHALE.

Rights of Man, Declaration of the, a famous statement of the constitution and principles of civil society and government adopted by the French National Assembly in August, 1789. It suggested the title for Paine's defense of the French Revolution against Burke (1791-2); which was followed by Mary Wollstonecraft Godwin's 'Vindication of the Rights of Women.'

RIGHTS—RIMOUSKI

Rights, Declaration and Bill of. See **BILL.**

Rigi, rē'gi, or Righi, Switzerland, in the canton of Schwyz, an isolated mountain rising precipitously between Lakes Zug and Lucerne to a height of 5,905 feet. It may be approached by two railways of special type, and affords fine views, much visited by travelers. Ample accommodation is provided visitors in the way of hotels.

Rig'or Mor'tis, the rigidity of the body which comes on after death. It varies in the time of its appearance and also of its duration, sometimes setting in within a few minutes after the cessation of life, at other times not for many hours, and lasting in some cases but a very brief period, in others for several days. It is believed to be due to the coagulation of fluid substance in the muscular system which occurs after the withdrawal of nutrition from the tissues. Decomposition begins when relaxation of the body follows the passing off of the rigor.

Riis, rés, Jacob Augustus, American journalist, author, and social reformer: b. Ribe, Denmark, 3 May 1849. He came to the United States in 1869, and worked at different trades, until he became a reporter on the *New York Sun*. In this work he gained a thorough knowledge of the conditions in the slums of the city, and by his lectures and writings aroused interest in the reforms in the tenement house district, and became a leader in the reform movement. When Theodore Roosevelt was police commissioner, Riis' thorough knowledge of the city was of the greatest aid to him, and the commissioner was usually accompanied on his all-night tours of investigation by Riis. Under the leadership of the latter police station lodging houses were abolished, small parks in crowded districts opened, playgrounds equipped, and many tenement house evils done away with. He, however, has held but one official position in connection with this reform work, that of secretary of the New York Small Parks Commission in 1897. His first book was 'How the Other Half Lives,' published in 1890; other writings are 'The Children of the Poor' (1892); 'Nibsy's Christmas' (1893); 'Out of Mulberry Street' (1898); 'A Ten Years' War' (1900); 'The Making of an American,' an autobiography (1901); 'Battle with the Slums' (1902); 'Peril and Preservation of the Home' (1903); 'Theodore Roosevelt, the Citizen' (1904).

Riley, ri'li, Charles Valentine, American entomologist: b. London, England, 18 Sept. 1843; d. Washington, D. C., 14 Sept. 1895. He was educated at Dieppe and at Bonn, and in 1860 came to the United States where he spent three years in studying practical agriculture. He then engaged in newspaper work and in 1864 went to the front in the Union army. In 1868 he was appointed State entomologist of Missouri and in that year assisted in founding the 'American Entomologist.' He was president of the Academy of Science at Saint Louis in 1876-7, chief of the United States entomological expedition under the Interior department in 1877, and in 1878 became United States entomologist in the department of agriculture, an office which he occupied until 1894 with the exception of 1879-80 when conducting the cot-

ton-worm investigation. In 1881 he was appointed curator of the National Museum and also became general secretary of the American Association for the Advancement of Science. He invented the "cyclone" or eddy chamber in nozzles for spraying purposes and made numerous discoveries of methods to control insect pests. His publications include: 'Annual Reports on the Insects of Missouri' (9 vols. 1868-77); 'Annual Reports as Entomologist of the Department of Agriculture'; 'Potato Pests' (1876); 'Locust Plague in the United States' (1877); 'The San Jose Scale' (1895); etc.

Riley, James Whitcomb, American poet: b. Greenfield, Ind., 1853. After a public-school education, he became a sign-painter, and, when he deemed himself suitably proficient in art, turned strolling player, and composed songs and remodeled plays for the company of which he was a member. Still later, he was an editorial writer on the staff of the *Indianapolis Journal*. He began to contribute poems to Indiana papers in 1873. His verses in the Indiana dialect won for him instant success and the sobriquet of "The Hoosier Poet," by which he has been generally known. This work is quite unique in American literature. Riley is not, however, limited to this, but has written with melody and imagination in literary English. His public readings from his books became very popular, particularly in the Western States. The poem 'Leonainie,' written by him in imitation of Poe, proved one of the most successful of literary hoaxes. He found a wide public, and at the beginning of the 20th century was among the most familiarly known litterateurs of the United States. His earlier verse and his first book, 'The Old Swimmin' Hole' (1883), appeared over the signature of "Benjamin F. Johnson of Boone." Subsequent volumes are: 'Character Sketches and Poems' (1887); 'Afterwhiles' (1888); 'Pipes o' Pan at Zekesbury' (1889); 'Old-Fashioned Roses' (1891); 'Neighborly Poems' (1891); 'Armazindy' (1894); 'Rubaiyat of Doc Sifers' (1897); 'Home-Folks' (1900); and 'Out to Old Aunt Mary's' (1903).

Riley, John, English painter: b. Bishopsgate, London, 1646; d. there 1691. He did not rise into notice until the death of Sir Peter Lely and remained unsurpassed until the appearance of Sir Joshua Reynolds. He was an imitator of Van Dyck, and in both drawing and coloring must be reckoned one of the best portrait painters of his time. He painted the portrait of Charles II., who rather disconcerted the artist by exclaiming: "Is this like me? Then, odd's fish, I am an ugly fellow." He also painted James II. and his queen, William and Mary, Bishop Burnet, Dr. Busby of Westminster, and Lord Keeper North.

Rimini, rē'mē-nē (ancient **ARIMINUM**), Italy, on the Adriatic, in the province of Forlì, celebrated for its mineral springs, the sea-bathing of the adjacent Porta Marina, and for the massive and elegant architecture of its chief buildings. Its fisheries are extensive. It was the seat of the celebrated Malatesta family. Pop. 50,000.

Rim'mon. See **RAMMON.**

Rimouski, rē-moos-kē, Canada, town in the county of Rimouski in the Province of

RIMU — RINDERPEST

Quebec; on the right bank of the Saint Lawrence River, and on the Intercolonial railroad; 185 miles northeast of the city of Quebec. The principal occupations are lumbering and fishing; trout and salmon are abundant. It is a favorite summer resort on account of its cool climate and the opportunities for hunting and fishing. Communications by water are cut off about half the year, when the river is frozen. Pop. about 1,500.

Rim'u, or Red Pine, a New Zealand tree (*Dacrydium cupressinum*) of the yew family. It grows to a height of 40 to 80 feet, and from 2 to 6 feet in diameter. The branches are pendulous and feathery, and the leaves slender and needle-like. Its brown wood is valued for general building purposes. The young branches make good spruce beer.

Rin'derpest, a general term covering various malignant diseases of neat cattle. Rinderpest proper is an acute infectious disease of cattle and sometimes of other ruminants, characterized by high fever, rapid pulse and cessation of milk-production during the first few days of the attack, followed by congestion and subsequently ulceration of the visible mucous membranes. The mortality is often as high as 90 per cent. This disease is on record since the 4th century. It was first known in eastern Russia and central Asia, whence it has periodically emerged, causing havoc in the herds of cattle and heavy losses to the various European nations. From Europe it spread to Egypt. It appeared in Somaliland in 1889 and spread southward, reaching the Zambesi in 1896. It caused great loss to South African farmers and led to troubles with the natives whose cattle were affected. Inoculation with a prepared virus has given encouraging results as a means of securing immunity. The stamping out process is the only way to combat the disease.

Pleuro-Pneumonia.—This "lung-fever" is a contagious malignant disease of cattle attended by inflammation of and exudation on the pleura and in the lungs. A disease, somewhat similar, has recently attacked goats. This disease has been recognized since the close of the 18th century, and at present occurs in Europe, Asia, Africa and Australia, but is under control in Great Britain. It was introduced into the United States in 1843, and outbreaks were reported at intervals. By 1883 the disease was distributed throughout the Eastern States and as far west as Chicago, and constituted a serious menace to the live-stock interests of the country. No temporary measures could be used in dealing with this scourge. The only ones practicable were quarantine, restriction of movement of cattle, slaughter of affected animals and disinfection. The wisdom of such measures is vouched for by the results. Less than five years of time and the expenditure of \$1,500,000, under the auspices of the Bureau of Animal Industry of the Department of Agriculture at Washington, sufficed to place this disease under control, and no case has been reported in the United States since 1892.

Anthrax.—This is a specific infectious disease of mammals including man, also known as splenic fever, charbon, wool-sorters' disease, etc., due to the presence in the blood of the micro-organism *Bacillus anthracis*. The dis-

eased animal may suddenly fall to the ground as in apoplexy and die, or it may live 10 to 24 hours or more in a sub-acute case. The symptoms are a high temperature, muscular trembling and labored breathing with prostration. The presence of the germ in the blood is proof of the disease. All carcasses should be burned, as if buried the germs may remain in the soil or be carried in the soil water. Cattle may be immunized by inoculating with attenuated virus, with toxins or antitoxin serums. Anthrax vaccine is on sale.

Blackleg, quarter-ill, etc., called also symptomatic anthrax, usually attacks young cattle. It is due to a bacillus. Immunity to this disease is conferred by vaccination with black-leg vaccine.

Texas, Southern, or Spanish Fever.—Texas fever is a contagious fever of cattle caused by a parasitic protozoan (*Pyrosoma bigeminum*), and is carried from southern cattle to northern cattle by the southern cattle-tick (*Boophilus bovis*). Adult ticks fall from the cattle, lay eggs, and thus infest the soil with young ticks that carry the germs. Northern cattle passing over the ground, get the ticks and subsequently the fever. When the ticks fasten themselves to the skin of cattle, they inoculate them with the parasites, which, in an unimmune animal, rapidly multiply, enter and destroy the red corpuscles of the blood, causing high fever and a temperature of 106° F. or more, general weakness and finally death. In the later stages the urine is highly colored, showing the great loss of red blood cells, giving rise to the name "red-water" for the disease. These symptoms and the presence of the ticks enable the disease to be recognized. Post-mortem examination reveals an enlarged spleen, containing a dark tarry substance instead of normal pulp. The ticks can be destroyed by dipping the cattle in a light lubricating oil containing dissolved sulphur. In the South cattle may be kept free from the fever by keeping them free from ticks in an uninfected enclosure. Young calves may be rendered immune by keeping ticks on them, and a considerable degree of immunity can be conferred on animals by inoculating them with the blood of southern cattle, thus producing the fever. This disease is thoroughly disseminated throughout the southern parts of the United States, and in 1899 regulations were promulgated establishing a Federal quarantine line from Virginia to California, and controlling the movement of southern cattle into the Northern States.

Foot and Mouth Disease or Aphthous Fever.—This is a contagious eruptive fever, attacking cloven-footed animals and communicable to many others, including man. Eruptions occur as blisters in the mouth, on the udder, teats and feet, with an elevation of temperature of from 2 to 6 degrees. Although in mild attacks only 2 to 3 per cent of the animals attacked succumb, it depreciates the value of the survivors from 20 to 50 per cent. When present in a malignant form, 5 to 50 per cent of the adults die, and 50 to 80 per cent of the calves. It is more to be feared than pleuro-pneumonia. The milk from diseased cows may transmit the disease to those partaking of it, and the disease produced in this manner is, especially when it attacks children, serious and sometimes fatal. The disease was first seen and recognized in

England in 1839 where it continued with more or less prevalence until 1886, when it abated only to reappear in 1892, 1894 and again in 1902, although no cattle were imported into the United Kingdom during this period. In 1870 it was introduced into the United States from Canada. In 1886 it was very prevalent in Europe and has continued its ravages to the present time. The introduction of the disease into New England in 1902 drew attention to the dangers of the malady. Isolation and quarantining of diseased animals is futile, and slaughter of diseased animals and prohibition of movement of stock in the infected areas are looked upon as the most efficacious method of eradicating the disease.

Tuberculosis.—One of the most insidious diseases affecting cattle and other animals. Like human tuberculosis, it is due to a germ, the tubercle bacillus which may affect any part of the body where it can secure a lodgment. Recent investigations show that the same bacillus may cause human and bovine tuberculosis, hence there is need to guard against human infection with bovine tuberculosis, and particularly to guard children from tuberculous milk. Plenty of good food, fresh air and sunlight, rigid cleanliness, the use of disinfectants, and the determination and isolation of affected animals are now viewed as the best means of checking the disease. The tuberculin test is a ready means of determining whether or not cattle are tuberculous. Tuberculin is made by growing the bacterium for two or three weeks in bouillon to which glycerine is added. The germs are then killed by heating and their remains removed by filtration. Carbolic acid is added to prevent decomposition and the fluid is packed in sealed sterilized bottles. Inoculation with this fluid causes a rise in temperature in the case of diseased animals.

Bibliography.—Consult 'Reports' of Bureau of Animal Industry, Washington, D. C.; Fleming, 'Manual of Veterinary Science and Police' (London, 1875); Friedberger and Frohner, 'Lehrbuch der speciellen Pathologie und Therapie der Haustiere' (Stuttgart, 1900); 'Report' of Seventh International Congress of Veterinary Surgeons (Baden Baden, 1899); 'Bulletins' 53 and 63 (Texas fever), Agricultural Experiment Station, Texas; 'Special Report on Diseases of Cattle and Cattle Feeding,' U. S. Department of Agriculture, (Washington, 1892); Law, 'The Farmer's Veterinary Adviser' (Ithaca, N. Y., 1892).

S. FRASER.

Rinehart, rin'härt, William Henry, American sculptor: b. Carroll County, Md., 13 Sept. 1823; d. Rome 28 Oct. 1874. He apprenticed himself at 21 to a marble-worker of Baltimore, and 10 years later went to Italy where he remained two years. On his return to Baltimore he executed several busts, and a fountain for the U. S. general post-office. He did not stay long in the United States, though his success as a sculptor met with much appreciation here, but established himself in Rome in 1858. Among his best known works are the reliefs 'Night' and 'Morning'; his highly poetic and well-wrought 'Clytie' and 'Love Reconciles with Death'; 'Latona and her Children'; 'Antigone'; 'Atlanta'; and 'Endymion.' He fin-

ished the bronze doors for the national Capitol, a work bequeathed to him by Crawford.

Rines, George Edwin, American editor: b. Maitland, Hants County, N. S., 28 Dec. 1860. Coming to the United States when 11 years old his early education was obtained in the public schools of Brooklyn, N. Y. For several years after graduating from the high school there he engaged in mercantile life, but in 1887 resumed his studies at Colgate University, Hamilton, N. Y. In 1890 he entered the full Hebrew and Greek course in theology, and graduated from the Hamilton Theological Seminary in 1893. He was for two years pastor at Binghamton, N. Y., afterwards accepting a call to the pastorate of the First Baptist Church of Ridgewood, N. J., where he remained for three years. He resigned from the ministry to devote himself to literary work, and has been a frequent contributor to religious and other periodicals. In 1903 he was appointed managing editor of the 'Encyclopedia Americana,' to which he has contributed many articles.

Ring, an ornament for the fingers which has been worn from the most ancient period of civilization. Among the ancient nations who are known to have attached special importance to the wearing of rings are the Assyrians, Egyptians, Hebrews, Greeks, and Romans. From the earliest period rings are associated with signets, and appear to have been worn as ornaments, especially by females, on various parts of the body besides the hand. The nose, ears, arms, and even the legs and toes have, among various peoples, been decorated with them. Rings have also from a very early period been reckoned as symbols of authority, and that in a double aspect. As a mere ornament rings would serve to represent dignity and honor, and as signets they were early used officially to delegate authority. Rings and bracelets are mentioned among the presents made by Abraham's servant to Rebecca. Among the Egyptians rings were worn in great profusion. They were made of gold, with an engraved stone or scarabæus, and were often very massive. The Egyptian rings were often of great size, so as to cover the space from one joint to another of the finger. In Sparta only iron rings were used. The Romans are variously said to have adopted the use of rings from the Sabines, the Etruscans, and the Greeks. For long they were made chiefly of iron, though sometimes of stone, and every free Roman had the right to use a seal-ring. The association of rings with marriage may have come down to us from the Romans, the bridal-ring being regarded as a pledge for the fulfilment of a contract. At first ring-wearing was confined to men among the Romans and was practised only to a limited extent, but growing luxury led to the excessive use of rings by both sexes. The right of wearing gold rings was at first accorded only to ambassadors, chief magistrates, senators, and finally to persons of the equestrian order, while silver began to supersede iron among ordinary citizens. Till the close of the republic the use of gold rings was a privilege of the equestrian order. A ring appears from an early period to have been one of the insignia of the office of a bishop and was often worn. The restoration of a deposed bishop was effected at the Council of Toledo (633) by returning to him the episcopal ring. Rings have always been in great demand among savage tribes when they have either had ingenuity enough to invent them, or have

RING AND THE BOOK — RINGGOLD GAP

come in contact with civilized nations who use them. Superstitious as well as sentimental feelings have often been associated with rings, and especially with the precious stones worn in them, to which particular characters were assigned. Rings were also used as charms against demons, evil eye, and other ills and inconveniences. Motto rings date from the time of the Romans; they appear also to have been in use among the Jews. They were long popular in Great Britain under the name of posies. See JEWELRY.

Ring and the Book, The, a poem of 21,000 lines by Robert Browning. This dramatic monologue, the longest and best sustained of Browning's poems, was published in four volumes in 1868-9, and is his greatest constructive achievement. It contains ten versions of the same occurrence, besides the poet's prelude, and presents from these diverse points of view the history of a tragedy which took place in Rome 170 years before.

Ring-bone, a bony excrescence on the pastern of a horse. It is a morbid growth, callus or exostosis, commonly due to inflammation, and in some cases extending to toe-joints with disabling effect. It is one of the more frequent ailments of horses and, although ordinarily affecting animals of inferior condition or injured by overwork, it sometimes appears in very young colts. While not always visibly impairing the serviceableness of a horse, ring-bone usually depreciates the market value of animals affected with it, and as cure is practically impossible it is a defect which calls for particular preventive methods in the care and breeding of horses, and for cautious scrutiny in the purchase of them.

Ring-dove, or **Cushat**. See DOVE; PIGEON.

Ring-money, in numismatics, an ancient metallic currency in the form of rings. This seems to have originated with the Egyptians, with whom rings were freely used as ornaments, and the same rings appear to have answered both purposes. The use of ring-money in Africa subsists to this day. A form of ring-money was also anciently used in Ceylon.

Ring-ouzel, oo'z'l, a European thrush (*Turdus torquatus*), rather larger than a blackbird and of shy habits, preferring mountain slopes, heaths, and wild land to cultivated districts, but it often makes raids on fruit gardens and in vine countries feeds largely on grapes. In some parts of Scotland it is known as the moor blackbird. The song consists of a few loud, clear, and plaintive notes, and is somewhat monotonous. It is dark-brown with grayish wings and has a broad crescentic white gorget, whence the name. See OUZEL.

Ring Plover, or **Ringneck**, a common plover or dotterel (q.v.) of the whole northern hemisphere (*Ægialitis hiaticula*), distinguished by its black collar and its brilliant, gold-colored eyes. This bird was formerly celebrated in European folk-medicine. To be cured of the jaundice it was held to be only necessary to look fixedly at the bird's eyes with a firm faith in the success of the experiment. See PLOVER.

Ring Snake, the name of various serpents with a band encircling the body, especially

at the neck. In the United States the name belongs especially to a small harmless serpent of the warmer States (*Diadophis punctatus*), which is found "coiled up under stones, logs or the bark of fallen trees, chiefly in forests." It is bluish black above, yellowish orange beneath and has a whitish collar. In Great Britain the common grass-snake (q.v.) is often so called; in South America, the many-banded coral-snakes and in South Africa a large black and yellowish venomous hooded snake (*Sepedon hamachates*) known to the Dutch as "ringhals," and differing from the cobras only in anatomical peculiarities. Consult Gadow, 'Amphibia and Reptiles' (1901).

Ring-tailed Lemur. See LEMUR.

Ringgold Gap, Battle of. After the expulsion of the Confederates from Missionary Ridge 25 Nov. 1863 they retreated on Dalton (see CHATTANOOGA, BATTLE OF). To intercept the retreat, Gen. Thomas, on the morning of the 26th, ordered Gen. Hooker to push on Graysville, from near Rossville, and directed Gen. Palmer, commanding Fourteenth corps, to report to Hooker and join in the movement. On reaching Pea Vine Creek Palmer was ordered to move directly on Graysville, while Hooker, with his three divisions—Osterhaus', Geary's, and Cruft's—moved on Ringgold to strike the Confederate line of retreat six miles farther south. At 9 P.M. Palmer struck the Confederate rearguard, capturing three guns and some prisoners. Pushing on to Graysville, which was reached at 11 P.M., he captured more prisoners and another gun, and bivouacked for the night. Hooker advanced to within six miles of Ringgold, and late in the night bivouacked a short distance to the right of Palmer. At daybreak of the 27th Hooker renewed the pursuit, Osterhaus' division, in the advance, capturing many prisoners, and pursuing the Confederates into Ringgold. At 3 A.M. of the 27th Gen. Cleburne, whose division was acting as rear-guard to Hardie's corps, received an order from Gen. Bragg to hold Ringgold Gap, in Taylor's Ridge, near the town, until the trains and rear of the retreating troops could get well advanced. Cleburne disposed his four brigades of about 4,200 men on the ridge, on each side of the gap, and as a support two guns in it, and in less than half an hour Hooker came up and Wood's brigade of Osterhaus' division was ordered to attack. Cleburne's skirmishers were soon driven in; but Cleburne, assuming the offensive, attacked Woods' main line and was repulsed, Wood's men following to the gap. Meanwhile Williamson's brigade had made a lodgment on a spur of Taylor's Ridge, half a mile to the left of the gap, but found the Confederates so strongly posted that it could make no headway, and Creighton's brigade of Geary's division was ordered to ascend the ridge still farther to the left. Cleburne had anticipated the movement, by still farther extending his right. Col. Creighton, making a gallant assault, was badly repulsed, and in falling back he carried part of Williamson's brigade with him. While Creighton was preparing for another assault he was killed, and operations on that part of the field were suspended. Meanwhile sharp work was going on in the gap and on the line on either side of it, without any material advantage to

Hooker. Between 12 and 1 o'clock Hooker's artillery came up and opened a furious fire upon Cleburne's position, but Cleburne had gone, leaving only a few skirmishers in the gap. These were closely followed by some of Geary's men to the bridges beyond the gap. Gen. Grant arrived on the field early in the afternoon, and ordered pursuit discontinued; later in the day Grose's brigade went forward, but encountering cavalry, supported by infantry, it returned to Ringgold. The Union loss at Ringgold Gap was 65 killed and 377 wounded. The Confederate loss, as reported by Cleburne, was 20 killed, 190 wounded, and 11 missing. Consult: 'Official Records,' Vol. XXXI; and Van Horne, 'History of the Army of the Cumberland,' Vol. I.

E. A. CARMAN.

Ringworm, a disease occurring in three varieties, in one of which it attacks the scalp, in another the beard, and in the third some other part of the body. In all cases it is due to the presence of a vegetable parasite, consisting of minute round bodies, and of thread-like structures formed of rows of rod-shaped bodies of a beaded appearance. This is the growing fungus (*Trichophyton tonsurans*) and its spores, and wherever ringworm occurs this is present between the layers of cells of the scarf-skin, in hairs and hair-sheaths. Ringworm of the body (*Tinea circinata*) is the name given to the disease when it occurs on non-hairy parts of the body. It is most common on the face, neck, and trunk, but it also occurs on the hands, arms, and wrists. It consists of small circular patches, rose-colored and slightly raised, covered with small branny scales. Usually round the margin is a ring of very small blisters. The spot is the seat of a tingling and itching sensation. It spreads round the margins, and as it spreads the centre heals up, so that a large red ring with a pale centre is formed. Ringworm of the scalp (*Tinea tonsurans*), identical with favus (*Tinea favosa*), begins with small red patches like those described above and spreads at the margins. It involves the hairs, which become penetrated by the fungus, and are dry, dull, and twisted. They are easily pulled out and become very brittle. The affected patch becomes covered with a grayish-white powder. Inflammation may be produced and crusts formed. This variety of ringworm is commonest in children. Ringworm of the beard (*Tinea sycosis*) is similar to the scalp variety. A lotion of bichloride of mercury is often sufficient to kill the fungus, but if it prove ineffectual glacial acetic acid may be painted all round the spreading margins of the ring. In ringworm of the head and beard the hair of the diseased patches and for a little distance beyond should be cut short, and crusts should be removed by poulticing, washing with water and soft soap, etc. The general health should be maintained by the use of tonics and otherwise. Ringworm is very contagious.

Rio Branco, *rê'ô brâng'kô*, a large river of Brazil, entirely in the state of Amazonas. It rises on the eastern slopes of the Serra Parima, near the sources of the Orinoco, flows eastward parallel to the Serra de Pacaraimo, turns southward before reaching British Guiana, and joins the Rio Negro about lat. 1° 25' S., lon. 61° 10' W. It has a length of about 830 miles, and receives numerous affluents.

Rio Cuarto, *koo-är'tô*, Argentina, a town of Córdoba province, near the source of the Cuarto River, on the railroad midway between Belleville and Villa Mercedes, 119 miles south of Córdoba. It is the distributing centre of a large agricultural region. Pop. 14,000.

Rio Grande, *rê'ô gränd* (Sp. *grän'dä*), or **Rio Grande del Norte**, a river which has its rise in the southwestern part of Colorado, flows south and southeast until it enters New Mexico, when its general course about half way across the Territory is south by west, then south by east to El Paso (q.v.), whence it forms the irregular boundary between Texas and Mexico. It enters the Gulf of Mexico after a course of nearly 1,900 miles. It is navigable for small boats only to Kingsbury Rapids, near Presidio, about 460 miles from its mouth. In the upper course the banks are generally high, and the irregular rocky beds form rapids and waterfalls. In the lower part of its course, the stream is shallow, and it is subject to periodical inundations. The largest tributary is the Pecos River, which enters the Rio Grande from Texas. A number of U. S. forts are on this river. The most important places are Brownsville, Eagle Pass, Laredo, and El Paso in Texas; and Matamoros and Nuevo Laredo in Mexico. A few villages and towns of importance are on the banks of the river in New Mexico.

Rio Grande de Cagayan, *rê'ô grän'dä dä kä-gä-yän*, the largest river of the island of Luzon, Philippines. It rises on the northeastern slope of Carabelllos Sur, and flows north in a winding course to the China Sea. It drains a large territory, and has numerous tributaries, the chief of which are the Magat and the Chico de Cagayan; its valley is very fertile, the land being used mainly for the cultivation of tobacco. The river is navigable for vessels drawing 12 feet as far as Lal-lo, 13 miles from its mouth; and for light draft vessels for 200 miles in the wet season. Freshets occur at times with a rise of several feet in a few hours.

Rio Grande College, located at Rio Grande, Ohio; founded in 1876 under the auspices of the Free Baptists. It offers a classical and a scientific course, and confers the degrees of bachelor of arts and bachelor of science. There is also a preparatory department. The college is co-educational, and women constitute fully one half of the student body. The grounds and buildings in 1910 were valued at \$40,000; the library contained 3,500 volumes; the productive funds amounted to \$76,000; and the annual income to \$6,000. The students numbered 175 and the faculty 10.

Rio Grande de Mindanao, *rê'ô grän'dä dä mên-dä-now*. See MINDANAO, GRANDE DE.

Rio Grande do Norte, *rê'ô grän'dä doo nôr'tä*, an important maritime state in the northeast of Brazil; area, 22,196 square miles. The surface is mountainous in the south and southwest, where it is covered by several mountain ranges. The principal rivers have all either a north or an east direction. The proximity to the equator makes the climate intensely hot; it is said, however, not to be unhealthful, the air being remarkably pure. The soil is generally good, but not remarkable for its fertility. For a long time the sugarcane was the principal cultivated crop, but considerable tracts formerly

RIO GRANDE DE LA PAMPANGA — RIO DE JANEIRO

devoted to it are now occupied by cotton, which may be regarded as the staple of the province. The other leading crops are manioc, millet, and haricots. Many of the plains are grazed by large herds of horses and cattle. The minerals include gold, silver, iron, salt, amethysts and rock-crystals, limestone, sandstone, and granite. The forests are not very extensive. Pop. 268,273.

Rio Grande de la Pampanga, *rě'ō grăn'dā dā lā pām-păn'gā*. See PAMPANGA, RIO GRANDE DE LA.

Rio Grande do Sul, *rě'ō grăn'dā doo sool*, a southern maritime state of Brazil; area, 91,336 square miles. Along the coast for more than half the extent of the coast-line of this state stretches the great Lago dos Patos, which communicates with Lake Mirim, and which receives the rivers of the southeastern part of the territory. Those to the southwest belong to the basins of the Paraná and Uruguay, and flow west. The mountain chain called Serra Geral divides the state into two unequal parts. The sea-coast is flat and sandy, and is lined by a series of reefs, which make the navigation dangerous. The interior is partly occupied by arid serras, but is mostly fertile. The climate is temperate, and the productions are more like those of Europe than of the rest of Brazil. Maize, rice, and flax, particularly the first, are largely cultivated. The finer European fruits, especially figs and peaches, find a genial soil. The minerals include gold, iron, sulphur, and porcelain clay of the finest quality. The chief occupation of the inhabitants is the rearing of cattle and the preparation of dried beef. Horses and mules are also reared. A number of German colonists and many Italians have settled in the state. There are several railways. Porto Alegre is the capital. Pop. 897,455.

Rio de Janeiro, *rě'ō dā zhā-nā'rō*, Brazil, one of the maritime states on the southeast coast of the republic; area, according to official returns, 26,634 square miles. The central part of this territory is mountainous, being traversed generally from east to west by a series of ranges, of which the loftiest and most conspicuous is the Serra dos Orgãos or Organ Mountains (q.v.). They are almost entirely composed of granite. The mountains slope down on the north and south—in the former direction toward the basin of the Parahyba, to which all the surface of the province on that side belongs; and in the latter to the coast, which receives the drainage from a great number of comparatively small streams, each carrying its waters directly to the ocean. The shore toward the northeast is lined by numerous lakes and lagoons. The soil does not seem to possess much natural fertility. Great part of it consists of a retentive clay, ill adapted for agricultural operations; but the warmth and moisture of the climate are so favorable to vegetation that magnificent forests and valuable crops are found, and there are many tracts of the richest land which are turned to the best account. The crop which attracts the largest share of attention is coffee. The other leading crops are sugar, rice, millet, manioc, and cotton. The forests are rich in timber, both for ordinary and ornamental purposes; in dye-woods, in gums and balsams, and valuable medicines. The domestic

animals, originally imported from Europe, have increased considerably, and immense herds of cattle are reared. This province is not rich in precious metals. Iron, however, abounds, though it is not worked; and the decomposition of granite has formed extensive beds of the finest kaolin. The state assembly used to meet at Nictheroy, but Petropolis is the present capital. Under separate jurisdiction from the state is the federal district of Rio de Janeiro, embracing the city of the same name (q.v.) and its surroundings. The population, inclusive of the federal district, according to the last census was 1,399,535.

Rio de Janeiro, capital of the United States of Brazil; socially and commercially the most important city of South America, excepting Buenos Ayres. The name is supposed to perpetuate an error of the discoverers (1 Jan. 1502), who, seeing the great length of the bay, assumed that it was the mouth of a river (*rio*). It is, in fact, a capacious and excellent natural harbor, with an area 68 square miles greater than the combined areas of the lower and upper bays of New York. But the bottom has silted up so much in recent years that the water near the shores has become too shallow for large vessels. Accordingly, some of the old mooring places have been abandoned. Merchant vessels which are unable to reach the docks cast anchor on the north side of the city, and their cargoes are transported in lighters. The future prosperity of Rio depends upon the successful execution of the plan for harbor improvements, which in 1903 was entrusted by the government to a British firm. Modern facilities for handling freights are to be provided in connection with a wide quay of solid masonry, which will extend along the entire northern front to a deep artificial channel. The outer wall of this quay, for about two miles, will be accessible to the largest shipping, and railway trains will run to the same point. This important work will, it is thought, be completed in 1910. The city proper is very compactly built on flat land adjoining the bay, but its suburbs stretch out along the shores for more than 17 miles. Above the crowded central portion rises Sugar Loaf Peak (*Pão d'Assucar*), and on the same side of the harbor is the fortress called São João—opposite which, on the eastern promontory, is Santa Cruz fortress. A small island, lying in the entrance between São João and Santa Cruz, is also fortified; and other defensive works are located in the bay on an island, which takes its name from the French adventurer Villegaignon, who tried to establish a colony of Huguenots there (1555-60). The main body of the city, covering less than a square mile, is divided into regular squares by narrow streets, along which pass lines of electric or horse cars, furnishing the only available means of transportation. The length of these lines is about 175 miles, and in 1897 the companies carried 83,000,000 passengers. The number of buildings in Rio is approximately 50,000, and its total area is sometimes said to be equal to that of any other capital in the world, but in such reckonings forest-covered hills are included. The most attractive suburban districts are Botafogo and Laranjeiras, the former built around an arm of the bay, the latter in a valley at the foot of

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Mount Corcovado; in both the residences are surrounded by beautiful tropical gardens. The National Museum, formerly the Imperial Palace of Boa Vista, is in the district of São Christovão. Some of the finest buildings—the Senate, City Hall, Mint, Normal School, Quartel-general, etc.—surround the old park, Praça 15 de Novembro, now called Campo de Sant' Anna. The Department of Foreign Relations occupies the old Palace of Itamaraty; the present government palace was formerly the luxurious residence of Conde de São Clemente the Chamber of Deputies, Department of Telegraphs, and Historical Institute are installed in the old Paço Palace. On the other hand, a fine modern building is devoted to the Department of Industry. An especially interesting feature is the Botanical Garden, in which rare exotics from all countries of the globe are cultivated, side by side with specimens of the flora of the various parts of South America. The Cathedral and Church of Santa Cruz stand near the water front, in a large square from which starts the main business street, Primeiro de Março. The rendezvous for men of prominence, an "open-air club," and the active centre of municipal life, is the Rua Ouvidor, a street of restaurants, book-shops, and newspaper offices. The very large wholesale and foreign trade of the city is in the hands of Portuguese, Brazilian, English, German, and French merchants. In the list of exports, coffee is the principal item; imports consist chiefly of food products and manufactured articles. There are at Rio cotton mills, furniture manufactories, foundries, dry docks, a naval arsenal, etc. A system of railways, of which the capital is the centre, covers the state and the southern part of Minas Geraes. The "Brazil Central" system is the most important in the republic, connecting Rio with São Paulo, and having a large number of branch lines, beside controlling the terminal facilities of the port and the suburban traffic. Originally known as the Dom Pedro Segundo Railway, this line was begun by a company in 1857, under a governmental guaranty. In 1860 the imperial government took control of it. Since the establishment of the republic the line has been extended to a length of 759 miles, and the cost of this system to the government has been approximately \$97,300,000 gold, or \$126,000 per mile. The road is moderately well built and equipped. Beside the numerous suburban trains, there are seven daily trains running to Barra do Pirahy, the junction point of the São Paulo and Minas divisions. Vessels entering the port in 1900 numbered 1,703, including 860 coasting vessels; those clearing numbered 1,707 (coastwise 917). The number of inhabitants is more than 800,000. On account of "poor sewerage and lack of hygienic measures," the city is one of the most unhealthful in Brazil. Yellow fever is endemic; smallpox and tuberculosis make great ravages from time to time. In the low-lying central section the heat of summer is exceedingly unpleasant, though elevated places in the vicinity—Corcovado Mountain, Petropolis (q.v.), Nova Friburgo, and other resorts—have an admirable climate. The water supply is regarded as very good. For public instruction see EDUCATION IN LATIN AMERICA. Useful institutions of public charity are the hospitals of the Sociedade de Beneficencia and the

very large Santa Casa de Misericordia, the former supported by the philanthropic Portuguese colony. Some events in the early history of this region are mentioned in the article BRAZIL. In Rio and São Paulo in 1870 was organized the Republican party, which brought to pass the overthrow of the monarchy without bloodshed (15 Nov. 1889); and the bay of Rio de Janeiro was the principal scene of the revolt of the navy, which, from 6 Sept. 1893 to March 1894, menaced the new Brazilian institutions. Compare: 'United States of Brazil: A Geographical Sketch,' Washington, Government Printing Office (1901).

MARRION WILCOX,
Authority on Latin America.

Rio Negro, rê'ô nã'grô ("black river"), the name of numerous streams, of which two are important: (1) A river of South America, and principal tributary of the Amazon. It rises in Colombia, and joins the Amazon after a course of about 1,000 miles at Manaos, Brazil. Through its affluent, the Cassiquiare, there is direct communication between the Amazon and Orinoco. (2) A river of South America forming the boundary between the Argentine Republic and Patagonia. It rises in the Andes in Chile, and is about 700 miles long. Its current is very rapid, and its bed obstructed with shoals and sand banks.

Rio de la Plata, rê'ô dâ lâ plã'tã. See PLATA, RIO DE LA.

Riobamba, rê-ô-bãm'bã, Ecuador, a town on the Pastaza River, a branch of the Amazon, about 100 miles from Quito. A former town of the same name, at the foot of Chimborazo Mountain, about 9 miles from the present town, was destroyed by an earthquake in 1797. Riobamba has a population of about 17,000, most of them Indians.

Rioja, Francisco de, frân-thês'kô dâ rê-ô'hã, Spanish lyric poet: b. Seville about 1600; d. Madrid 8 Aug. 1659. He studied first law and then theology. The minister Olivarez obtained for him a prebend in the cathedral of Seville, and then became royal historiographer, inquisitor at Seville, and lastly, inquisitor of the supreme tribunal of the holy office. The downfall of his patron involved his own: he was imprisoned, and only obtained his liberty after he had undergone a formal trial and completely established his innocence. Philip IV., whose favor he had regained, made him director of the royal library and councillor in the supreme court of the Inquisition. As a poet, he formed himself on the classic and Italian models, particularly Horace and Seneca; kept himself, in style and language, free from the tasteless eccentricities of his contemporaries, and thus preserved the true spirit of the lyric. His 'Silvas' exhibit rich pictures of rural life, remarkable for their truth to nature. His works were published with a biography by D. Cayetano de la Barrera, 'Poesias' (1868); and 'Adiciones a las poesias de D. Francisco de Rioja' (1872). Consult Longfellow, 'Poets and Poetry of Europe' (1843).

Rioja, La, Argentina; (1) the capital of a province 118 miles by rail southwest of Catamarca, at the foot of the Sierra Velasco, in the midst of vineyards and orange groves. Pop. about 7,000. (2) A western province north

of San Juan and south of Catamarca, with an area of 69,502 square miles, divided into 18 departments. While in the east and south there are salt and sand deserts, it is well watered on the west, and agriculture and cattle rearing are important industries. Excellent wheat, fruits, and wine are produced. The climate is dry and healthful. Near Chilecito and Famatina are valuable gold, silver, and copper mines. Pop. about 79,000.

Rion, *rē-ōn'*, or **Rioni**, *rē-ō'nē*, from **Phasis**, a river of Colchis (Transcaucasia, Asiatic Russia), anciently regarded as the boundary between Europe and Asia. It was afterward held as the boundary line between Colchis and Asia Minor. It rises in a spur of the Caucasus (Moschici), and after receiving the rivers anciently called the Rhion, the Glaucaus, and the Hippius, it falls into the Euxine near the ancient town of Phasis. In the early part of its course it was called the Boas. Its modern name is Rion or Rioni. Other rivers were sometimes confounded by ancient writers under the same name with this. The Phasis of Xenophon was the Araxes.

Riordan, *rē-ōr-dan*, **Patrick William**, American Roman Catholic archbishop: b. New Brunswick 27 Aug. 1841. He was educated at Notre Dame, Ind., and was graduated from Louvain, Belgium in 1864. He then returned to Chicago, accepted the chair of theology at the Seminary of Saint Mary's of the Lake, and in 1868-71 was pastor of Saint Mary's church at Joliet, Ill. From 1871-83 he was in charge of Saint James' Church, Chicago, and in the latter year was consecrated titular archbishop of Cadesa and was made coadjutor. He succeeded to the see of San Francisco in 1884.

Riordan, **Roger**, American artist and author: b. Ireland, 1848; d. 1904. He studied art at the Art Students' League in New York, contributed as illustrator and writer on art subjects to various magazines, and served on the international jury of awards at the Paris Exposition, 1900. He published 'Sunrise Stories, a Glance at the Literature of Japan'; 'French Etchers,' and collaborated on the Catalogue of the Marquand collection.

Riot, a disturbance of the public peace, attended with circumstances of tumult and commotion, as where an assembly destroys, or in any manner damages, seizes, or invades private or public property, or does any injury whatever by actual or threatened violence to the persons of individuals. By the common law a riot is an unlawful assembly of three or more persons which has actually begun to execute the common purpose for which it assembled by a breach of the peace, and to the terror of the public. A lawful assembly may become a riot if the persons assembled form and proceed to execute an unlawful purpose to the terror of the people, though they had not that purpose when they assembled. In England, every person convicted of riot is liable to be sentenced to hard labor. In Scotch law rioting is termed mobbing. A person may be guilty of mobbing who directs or excites a mob, though he is not actually present in it. Mere presence without participation may constitute mobbing. A majority of the States of the American Union have riot acts somewhat similar to those of England, and the

common law governs where no statutes have been enacted.

Riouw-Lingga, *rē'ow līn'ga*, or **Riou Linga**, an archipelago southeast of the Malay Peninsula, belonging to Netherlands. It is formed of two groups of islands, the northern group is that of Riouw, and the southern, Lingga. There are about 30 islands in the Riouw group, the largest, Bintang, has an area of 400 square miles. Lingga, of the Lingga group, has an area of 320 square miles; Singkep, 204 square miles. The soil of the greater part of the archipelago is fertile, and the whole is well wooded. The principal export is gambir; other exports are pepper, sago, and rice. Tin has been mined and exported for many years. The original inhabitants have nearly all disappeared; the population now is made up of Chinese, Japanese, Javanese, and Kings. Pop. about 78,000.

Rip-rap, a common name applied to broken stones used for beds, walls and foundation in building and construction. See MASONRY.

Rip Van Winkle, *rip vān wīng'kl*, a character in one of Washington Irving's legends of the Hudson Valley. While hunting among the mountains he falls in with the reputed followers of Hendrik Hudson and by drinking the liquor they offer him is cast into a sleep of 20 years. When he awakes and returns to the village of Laughing Water, he finds all things changed, but is chiefly relieved to discover that his wife, the irritating obstacle to his easy-going life is no longer alive. The story was dramatized by Joseph Jefferson (q.v.) and formed one of the important rôles in his repertory.

Riparian Rights are those of one who owns the land bounding upon a water course; such owner is the proprietor of that portion of the bed of a river which adjoins his land; such rights upon navigable waters depend largely upon statute and customs of the different jurisdictions. A riparian owner has the right of access to navigable water, and for that purpose to erect a wharf or pier, provided it does not encroach upon the navigable waters sufficiently to interfere therewith. A riparian owner has also a right to the accretions of the soil and to fish in the adjacent waters; he has also the right to have the stream flow naturally without changing it in quantity or otherwise. Such owner is not entitled to the water, but merely to its use, and is without the right to divert, obstruct or corrupt the stream, except to build such lawful obstructions as may be necessary for bridges, wharves and dams. Riparian rights of property are established property, of which the owner cannot be deprived except by due process of law. (See RIVERS.)

Ripley, *rip'lī*, **Eleazar Wheelock**, American soldier: b. Hanover, N. H., 15 April 1782; d. West Feliciana, La., 2 March 1839. He was graduated from Dartmouth College in 1800, engaged in law practice and in 1811 settled at Portland, Maine. In 1810-11 he was a member of the Massachusetts legislature, served as speaker in the latter year and in 1812 was elected State senator. At the outbreak of the War of 1812 he entered the army, became brigadier-general in 1814, and for services at Niagara, Chippewa, and Erie was voted a gold medal

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by Congress. He remained in the army until 1820 when he removed to Louisiana and resumed the practice of law. He afterward served in the State senate and was a member of Congress from 1835 until his death.

Ripley, George, American author: b. Greenfield, Mass., 3 Oct. 1802; d. New York 4 July 1880. He was graduated at Harvard in 1823, studied theology at Cambridge and in 1826 was ordained a Unitarian minister in Boston. He became interested in the principles of Fourier, Comte, and St. Simon, and made translations of the writings of modern German and French philosophers and endeavored to introduce their ideas in America. He collaborated with Dr. Hodge on a large work in 14 volumes, 'Specimens of Foreign Standard Literature' (1838-42). His 'Discourses on the Philosophy of Religion' (1839) gave rise to a long and bitter controversy with Professor Andrews Norton of Cambridge. He was a leader in the Transcendental Movement originating in 1836 in association with Emerson and others, wrote frequently for 'The Dial,' the organ of that movement. In 1841 he definitely retired from the ministry and became the prime mover in the communistic enterprise of Brook Farm (q.v.), and in 1844 invested all his small fortune in that settlement in West Roxbury. After the burning of the phalanstery in 1846 and the dispersion of the colony, he went to New York as literary editor of the *Tribune*; contributed also to the literary department of 'Harper's Monthly.' With Bayard Taylor he edited a 'Handbook of Literature and Fine Arts' (1852), and in 1858, with Charles A. Dana (q.v.), began the editing of 'Appleton's New American Cyclopedia.' Consult: Frothingham, 'George Ripley' (1882); Swift, 'Brook Farm' (1909).

Ripley, James Wolfe, American soldier: b. Windham, Conn., 10 Dec. 1794; d. Hartford, Conn., 16 March 1870. He was graduated from West Point in 1814, served in the second war with Great Britain, his first engagement being in the defense of Sackett's Harbor. In 1818 he was promoted lieutenant, fought in the Seminole war and was appointed commissioner to establish the boundary line of the Florida reservation in 1823-4. He was captain in command of Charleston Harbor at the time of the Nullification troubles in 1832-3 and in 1841-54 was superintendent of the Springfield Armory. He was brevetted lieutenant-colonel in 1848 for services in the Mexican War, receiving full rank in 1854. He was promoted brigadier-general in 1861, and after 1863 was inspector of fortifications on the coast of New England. He was brevetted major-general in 1865.

Ripley, William Zebina, American educator and economist: b. Medford, Mass., 1867. He was graduated from the Massachusetts Institute of Technology in 1890, made a specialty of economics and in 1893 became lecturer at Columbia. In 1895-1901 he was professor of economics at the Massachusetts Institute of Technology and since 1901 has occupied that chair at Harvard. He has published: 'Financial History of Virginia' (1893); 'The Races of Europe' (1899); etc.

Ripley, Ohio, village in Brown County, on the Ohio River, and on the Chesapeake & Ohio railroad; 45 miles southeast of Cincinnati. It

was founded about the time of the War of 1812, and was at first called Staunton; later its name was changed in honor of General Ripley, an officer in the war. For a time the county courts were held here, but the county-seat was finally moved to Georgetown. The first station on the "underground railway" for runaway slaves was located in Ripley. It is in a noted tobacco region, and has a number of tobacco packing houses and factories; its other industrial establishments include a piano factory and shoe factories, and it carries on a considerable river trade. Pop. (1910) 1,840.

Ripon, rip'ôn, England, a cathedral city in the county of York (West Riding), on the Ure, 22 miles by rail northwest of York. The cathedral of Saints Peter and Wilfrid, restored 1862-76, is one of the finest churches in England; length, east to west, 266 feet; width of transept, 132 feet; the three towers 120 feet high, were crowned by spires prior to 1660. The city has also other fine ecclesiastical, municipal, and benevolent institutions. The principal manufactures are machinery, saddle-trees, leather, and varnish. The abbey of Ripon was founded in the 7th century, and the Saxon crypt of the cathedral was probably built by Wilfrid in 674-678. The see of Ripon was established in 1836.

Ripon, Wis., city in Fond du Lac County; on Silver Creek, an inlet of Green Bay, and on the Chicago & N., the Chicago, M. & St. P. R.R.'s; about 85 miles northwest of Milwaukee, and 18 miles west by north of Fond du Lac.

Ripon was settled in 1844 by the "Wisconsin Phalanx" (q.v.) an organization of 19 members, founded at Southport, Wis. The "Phalanx" was based upon Fourier's principles, but only the best of Fourier's rules were followed; free-love ideas never gained a foothold here. The advantages for farming in the rich Ceresco Valley caused the "Phalanx" to locate in what is now Ripon and the surrounding lands. The name they gave to the valley, Ceres, the goddess of grain, and Co., company, making Ceresco, shows that agriculture was of first interest. The city was named Ripon by John Homer, whose ancestors had lived in Ripon, England. The "Phalanx" prospered and held together as an organization for six years. The reports of gold in California was one of the causes of unrest which led to the voluntary and peaceable disbanding of the organization in 1850. The enterprise had prospered so well that at the final division eight per cent above par was paid on the stock. The city was incorporated in 1849 and chartered in 1858. Ripon claims to be the birthplace of the Republican party, and one of the historic buildings is pointed out as the place where the first meetings were held and where the party received its name. The chief industrial wealth of the city is connected with the products of the rich farms of the valley. Grain, fruit and vegetables are abundant, and the dairy products are of considerable value. The chief manufacturing establishments are knitting works, in which there are 200 employees; glove factory, 50 employees; carriage works, 50; machine shops, 20; and pickling works, creameries, box and crate factories, and flour and feed mills. There are 10 churches, and a number of fine business blocks. The educa-

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tional institutions are Ripon College, organized in 1851, a high school, graded elementary schools, and a free public library. The two banks have a combined capital of \$175,000. The government is vested in a mayor and a council of eight members, who hold office two years, four of whom are elected each year. Ripon is a favorite summer resort on account of its climate, beautiful scenery, and the attractive drives to nearby points of interest. Pop. (1900) 3,818; (1910) 4,090. The population doing business in Ripon is about 7,000.

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Editor 'The Ripon Commonwealth.'

Ripon College, located at Ripon, Wis., organized in 1853. Though the Congregationalists have contributed largely to its support and prosperity, it is not under denominational control. Its organization includes a collegiate department, a preparatory department, and departments of music and of art; normal courses are also given. In 1901 the group system of elective studies was adopted and a new professorship in history and economics established; the collegiate courses are arranged in three general groups, classical, literary and scientific, but only the one degree of A.B. is conferred. Women are admitted to all departments. The campus includes 10 acres; the grounds and buildings in 1910 were valued at \$196,300; the library contained 19,000 volumes, and the annual income was \$62,000. The students for the year 1910 numbered 258, and the faculty 26.

Ripple-mark, a furrowed or wavy surface often caused on sand by the motion of water or the action of wind, or by their combined agency. Such marks are seen on sandstone of all ages, where they are considered to have been produced by the ripple of the tide on what was once the sandy shore of an ancient sea. Beach ripple may generally be distinguished from ripples due to currents by the frequent changes which occur in its direction.

Rise of the Dutch Republic, The, a historical work by John Lothrop Motley, first published in 1856. It proved an immediate popular success; and was followed by a French translation (supervised with an introduction by Guizot) in 1859, and soon after by Dutch, German, and Russian translations.

Rishis, rī'shīs or r'shīs, sages of the Hindu mythology, sprung from the mind of Brahma, and attendants in alternate months on the sun. Seven of them are enumerated. The Rishis were also inspired sages, of whom the Vishnu Purana enumerates three kinds—royal rishis, or princes, who have adopted a life of devotion; divine rishis, who are both sages and demi-gods; and Brahman rishis, or sons of Brahma. Rishi afterward came to be applied to all personages distinguished for piety and wisdom.

Risley, rīz'li, **Richard Voorhees**, American novelist: b. New York 8 Nov. 1874; d. there 30 March 1904. He was educated in military and other schools and spent several years in foreign travel. He has published: 'The Sentimental Vikings' (1897); 'Men's Tragedies' (1899); 'The Sledge' (1900); 'The Anvil.'

Ristori, rēs-tō'rē, **Adelaide**, Italian actress: b. Cividale, Italy, 29 Jan. 1822; d. Rome, 9 Oct. 1906. She appeared on the stage as a child, and her early parts were in Soldoni's

comedies. After her marriage in 1846 to the Marchese Giuliano del Grillo she retired from the stage for a time, but after her return she devoted herself thenceforth to tragic roles. In 1855 she appeared in Paris in Silvio Pellico's tragedy of 'Francesca da Rimini' and achieved a great success. Her engagement there was followed by a tour of Europe and from that time she was frequently seen in the large cities of the Continent and Great Britain. She made her first appearance in America at the Lyric Theatre, New York, 20 Sept. 1866, and her tour of the United States lasted for eight months. In 1869 she played in South American cities and in 1874 made a journey round the world. She made her fourth and last visit to the United States in 1884 and during that tour which ended in May of the following year appeared as Lady Macbeth in company with Edwin Booth. After 1885 she did not appear on the stage. Her greatest parts were Mary Stuart, Myrrha, Medea, Phædra, Lady Macbeth and Queen Elizabeth.

Ritchie, rīch'i, **Anna Cora Ogden Mowatt**, American actress and author: b. Bordeaux 1819; d. Henley-on-Thames, near London, England, 28 July 1870. She was successful as a playwright and dramatic reader, and in 1845-54 appeared with much favor on the stage in both the United States and England, where she was seen with E. L. Davenport (q.v.). Some of her books were published under the pseudonyms of 'Isabel,' and 'Helen Berkley.' They include: 'The Fortune-Hunter' (1842); 'The Mute Singer,' 'Fashion,' a comedy (1847), which was very popular; 'Evelyn' (1845); 'The Autobiography of an Actress' (1854), the best-known and most popular of her productions; 'Mimic Life' (1855); 'Fairy Fingers' (1865); 'The Clergyman's Wife' (1867).

Ritchie, **Anne Isabella Thackeray**, English author: b. London 1837. She is the eldest daughter of William Makepeace Thackeray (q.v.) and was educated at Paris and Kensington and in 1877 was married to Richmond Ritchie. Her first literary work was published in the 'Cornhill Magazine' while her father edited that periodical. In 1863 she published 'The Story of Elizabeth' which met with success. Since that time she has published fiction, biography and literary reminiscences, among which may be named: 'The Village on the Cliff' (1865); 'To Esther, and Other Sketches' (1869); 'Old Kensington' (1873); 'Toilers and Spinners' (1873); 'Bluebeard's Keys' (1874); 'Miss Angel' (1875); 'Anne Evans' (1880); 'Madame de Sévigné' (1881); 'A Book of Sibyls' (1883); 'Mrs. Dymond' (1885); 'Records of Tennyson, Ruskin and Browning' (1892). The biographical edition of Thackeray's works was edited by her, and her prefaces and notes contain a partial substitute for an authoritative biography against which Thackeray left a prohibition. Her 'Chapters from Some Unwritten Memoirs' (1895) is a work of autobiographical character.

Rite, in religious use, any external sign or action employed as an expression of reverence or devotion, or as a means of exciting internal religious sentiments. The ancient religion of Judaism abounded in rites and ceremonies, and the sect or school of the Pharisees appears to have laid more stress on compliance with these

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observances than on the weighty injunctions of the law. Jesus Christ repeatedly expressed contempt for the scruples of the Pharisees, and many of those who aim to walk strictly in his footprints repudiate everything like ceremonialism in divine worship. But the vast numerical majority of Christians demand a more or less stately and impressive ceremonial. Rite is used also to express the sum of the ceremonial employed in the administration of the sacraments, as, the "rite" of baptism, the "rite" of confirmation, "the last rites"; again, the entire liturgical ceremonial of a particular branch of the church is spoken of as a "rite," for example, Latin rite, Greek rite, Syrian rite, etc.

Rites, Congregation of, a commission or standing committee of cardinals of the Roman Catholic Church, instituted in the 16th century by Sixtus V. Its function is to exercise supervision throughout the entire church over all ecclesiastical rites and ceremonies, in particular those belonging to the Mass, with a view to prevent the introduction of novelties without express approval, and to maintain unaltered the usages sanctioned by the tradition of the Fathers and the prescriptions of the rubrics. It is the Congregation of Rites that takes cognizance of all matters concerned with the beatification and canonization of deceased servants of God.

Ritschl, ritsh'l, Albrecht, German theologian: b. Berlin 25 March 1822; d. Göttingen 20 March 1889. He studied in the universities of Bonn, Halle, Heidelberg, and Tübingen, qualified at Bonn as a lecturer in 1846, became extraordinary professor of theology there in 1852, and ordinary professor in 1859. In 1864 he accepted a call to the corresponding chair at Göttingen. From 1874 he was a consistorial councillor. In his early thesis, 'Das Evangelium Marcions und das kanonische Evangelium des Lukas' (1846), he adopted the position of his master, F. C. Baur, but in the first edition (1850) of his 'Entstehung der altkatholischen Kirche' ('Origin of the Early Catholic Church') he showed signs of divergence, and the publication of the second edition of the latter work in 1857 marked his complete severance from the Tübingen school. His chief subsequent works are: 'De Ira Dei' (1859); 'Die christliche Lehre von der Rechtfertigung und der Versöhnung' ('The Christian Doctrine of Justification and the Atonement,' 3 vols. 1870-74; 3d ed. 1888-9), his chief work; 'Schleiermachers Reden über die Religion und ihre Nachwirkungen auf die evangelische Kirche Deutschlands' (1874); 'Die christliche Vollkommenheit' ('Christian Perfection,' 1874); 'Unterricht in der christlichen Religion' (1875; 5th ed., 1895), a succinct statement of his theological position; 'Geschichte des Pietismus' (1880-6); 'Theologie und Metaphysik' (1881); 'Drei akademische Reden' (1887); 'Fides Implicita' (1890); and 'Gesammelte Aufsätze' ('Collected Essays,' 1893 and 1896). Ritschl founded a school of theology still of much importance both in Germany and in other countries. Starting from a subjective theory of cognition, based upon the philosophy of Kant as developed in Lotze, he sought to eliminate the whole metaphysical element from religion. He was thus led to reject such doctrines as original sin, the Trinity, the incarnation, whether historic or mys-

tical, and the whole of natural theology, as of no religious value, and he denied the preexistence and miraculous birth of Jesus. He laid stress upon the historical character of Christianity, but held free views of inspiration, and admitted the most advanced criticism. His view of the atonement was essentially the same as the "moral influence" theory of liberal theologians. See the 'Life' by his son Otto (1892-6); Pfeiderer, 'The Development of Theology in Germany since Kant' (1890; German ed., enlarged, 1891); 'Die Ritschlsche Theologie kritisch beleuchtet' (1891); and Schon, 'Les Origines historiques de la Théologie de Ritschl' (1893).

Ritschl, Friedrich Wilhelm, German classical scholar: b. Thuringia 6 April 1806; d. Leipsic 9 Nov. 1876. He was educated at Leipsic and Halle, where he devoted himself to classical studies, and in 1832 was appointed extraordinary professor at Halle. He subsequently held professorships at Breslau and Bonn, and in 1865 accepted a call to Leipsic, where he remained until his death. His chief work is a critical edition of Plautus' Comedies (1848-54, incomplete; entirely remodeled edition, 1881-94). His other works include 'Parerga Plautina et Terentiana' (1845); 'Priscæ Latinitatis Monumenta Epigraphica' (1864); 'Opuscula Philologica.'

Rit'son, Joseph, English antiquarian: b. Stockton-on-Tees, England, 2 Oct. 1752; d. London 23 Sept. 1803. He studied law, became conveyancer in London and deputy high bailiff to the duchy of Lancaster. For many years he devoted his time to antiquarian researches and the editing of rare books, and he assisted Sir Walter Scott in preparing his work on the Border Minstrelsy. His works include: 'Observations on Warton's History of English Poetry' (1782); 'Ancient Songs from the Time of King Henry II. to the Revolution' (1790); 'Ancient English Metrical Romances' (1802); etc. Consult: 'Letters of Joseph Ritson, with a Memoir by Sir Harris Nicolas' (1833).

Rittenhouse, rit'n-hows, Benjamin, American surveyor: b. Norriton Township, now Montgomery County, Pa., about 1740; d. Philadelphia 31 Aug. 1825. From 1776 to 1778 he was superintendent of a gun factory, maintained by the State of Pennsylvania. He sat in the Assembly of Pennsylvania from 1784 to 1788 and was appointed commissioner to survey the Schuylkill River in 1789. In 1792 he became associate judge of the court of common pleas of Montgomery County. His surveyor's chain made by order of Congress in 1796 has been the standard of the United States land office ever since. He was a brother of David Rittenhouse (q.v.).

Rittenhouse, David, American astronomer and mathematician: b. Germantown, Pa., 2 April 1732; d. Philadelphia 26 June 1796. His great-grandfather, Willem Rittinghuysen, a Mennonite, emigrated from Arnheim, in Holland, in 1688, and set up, on the banks of the Wissahickon Creek, the first paper mill in America. His mother, Elizabeth Williams, was from a Welsh Quaker family. When David was a small boy, the family moved to a farm in Montgomery County, and he lived the usual life of a country lad. From an uncle he inherited, when about 12, some books on calculation and geometry, and henceforth his life was determined. Mathematics and computation be-

came the passion of the boy and the absorbing interest of the man. To these should be added a great facility in mechanical invention and execution. In his teens he began to make clocks of wood and metal, and his father set him up in the business of maker of mathematical instruments and clocks. He is said to have independently discovered the method of fluxions or the calculus when but 19, and to have foreseen its vast utility, before he heard of the claims of Leibnitz and Newton. A friend, Rev. Thomas Barton, furnished him with linguistic and scientific works and his intense assiduity made him a scholar.

In 1763 his fame as an accurate worker in science gave him his first public employment. He was appointed to lay out on the ground the 12-mile radius around Newcastle, which forms the boundary between Pennsylvania and Delaware. This he did most accurately with instruments of his own construction, and Mason and Dixon accepted his results as final. In 1769 he located the point where the 41st parallel of latitude, the boundary between Pennsylvania and New York, strikes the Delaware River. His scientific activities were incessant. In 1769 occurred the transit of Venus, then supposed to be the most reliable means of determining the distance to the sun. Rittenhouse had read a paper before the American Philosophical Society, with computations of the time of ingress and egress, and the Pennsylvania legislature had appropriated £200 toward the observations. He built an observatory near his home in Norriton, and, in company with a committee appointed by the Society, made the most exquisite preparations for the occasion. Everything came off beautifully, and after it was over he fainted. His results were the best obtained in the world, and the computed parallax of the sun the most accurate then known.

He invented the plan of placing spider lines in the focus of his telescope, an arrangement that has done more to make accurate measurements possible than almost anything else of the kind. In 1770 he completed his famous orrery based on computations of his own. This showed the movements of the planets and moons in elliptic orbits around their primaries, the phenomena of eclipses, and the relative places of the members of the solar system over a time of 5,000 years preceding or following. For this he received £300 from Princeton University, and a like sum from the legislature of Pennsylvania as a testimonial to his genius for a second orrery for the University of Pennsylvania. The first one was injured by the British troops in the Revolutionary War.

Then followed computations of the orbits of comets, surveys of the land between the Delaware and Susquehanna for canal purposes, calculations for almanacs, surveys for a series of dams to make the Schuylkill River navigable, and various papers on astronomy for the Philosophical Society. His fame extended to Europe and many honors came to him, while he was looked upon with profound respect and pride by his countrymen who could appreciate his work. He was most modest and simple in his tastes, and if his life could have been spent in the pursuit of science, it was fondly believed that the American Newton had been found. But he conceived that his country called for

service in another field. He was engineer and finally president of the Committee of Safety of his state during the Revolutionary War, and plunged into military problems with all his energy. In 1776 he was made a member of the Assembly of Pennsylvania, the earliest under the reorganized Revolutionary movement, and was active in the creation of the new constitution, the first for the State of Pennsylvania. No one took a more prominent part than he. In 1777 and for 12 successive years, he was elected state treasurer. He was also trustee of the Loan Office. Throughout the war his time was taken up with administrative duties which he disliked, but faithfully performed.

After the war, about five years were expended in determining the boundaries of Pennsylvania. The five degrees along Mason and Dixon's line were ascertained by observations on Jupiter's satellites at each end with instruments made by himself. He was also engaged in running the western and northern boundaries of his State, and at the appointment of Congress, in 1787, the line between New York and Massachusetts. From 1779 to 1782 he was professor of astronomy in the University of Pennsylvania and afterward trustee and vice-provost of that institution. In 1792 he was made director of the United States mint by President Washington. After three years of service, he resigned and returned to scientific work. He succeeded Franklin as president of the American Philosophical Society in 1790. Degrees were conferred upon him by the University of Pennsylvania, by Princeton and by William and Mary, and the Royal Society of London made him an honorary member. "We have supposed," said Thomas Jefferson, "Rittenhouse second to no astronomer living; that in genius he must be the first because he is self-taught."

He was an ardent Republican. He allied himself with the strong Revolutionary party and with the anti-Federalists after the war. He was president of a society organized to sympathize with the French Revolution and was a loyal member of the party which later under Jefferson introduced the extreme democracy of the reactionary period which followed Federalism. Whether he was in fault or not in his political affiliations will be differently judged, but posterity can unite in admiration for the self-educated scientist of the highest type and for the lovable, honorable, sincere gentleman.

His publications, about 20 in number, appeared in the Transactions of the American Philosophical Society. The most popular was an Oration on Astronomy. An interesting 'Eulogium' was delivered after his death by Dr. Benjamin Rush. His life was written by his nephew, William Barton, in 1813, and by James Renwick in Sparks' American Biography. A discriminating account of him, by S. W. Pennypacker, was issued in 1882.

ISAAC SHARPLESS,
President Haverford College.

Ritter, rīt'èr, Frederic Louis, American musician and composer: b. Strasburg, Alsace, 22 June 1834; d. Antwerp, Belgium, 6 July 1891. He studied music at Paris with Georges Kastner, taught at the seminary at Fénéstrange, Lorraine, and in 1856 came to America and settled at Cincinnati. Here he organized the Cecilia

(choral) and Philharmonic (orchestral) societies. Removing to New York in 1861 he became the conductor of the Sacred Harmonic and the Arion Choral Societies. The first musical festival of note held in New York was given under his direction in 1867. That year he assumed the duties of the professorship of music at Vassar College, which position he held until his death. He was a prolific composer of vocal music such as solos and choruses, among which were musical settings for several Psalms, 'O Salutaris,' an 'Ave Maria,' a group of Persian songs, and more than 100 German lieder. He also wrote works for orchestra and piano-forte and was the author of 'A History of Music in the Form of Lectures' (1870-4); 'Music in England' (1883); 'Music in America' (1883); 'Manual of Musical History' (1886); and 'Musical Dictation' (1888).

Ritter, Heinrich, hin'rin rit'tër, German philosopher: b. Zerbst in Anhalt, 21 Nov. 1791; d. Göttingen 3 Feb. 1869. He studied at Halle, Göttingen and Berlin from 1811 to 1815, and in the last named year the calling out of the volunteers led him to France. On his return he devoted himself exclusively to philosophy, especially in the department of history, in which he adopted the method and critical views of Schleiermacher. He qualified himself at Berlin as a university teacher, and from 1824 held an extraordinary professorship in that city until he accepted a call to Kiel in 1833, whence in 1837 he removed to Göttingen, where he continued to occupy the university chair of philosophy till his death. Ritter's best works belong to the history of philosophy, his first in this department being an investigation into the doctrines of Empedocles in Wolf's 'Literarische Analekten' (1820). His 'History of Ionian Philosophy' (1821); 'History of the Pythagorean Philosophy' (1826), and 'Notes on the Philosophy of the Megarean School' in the *Rheinisches Museum*, are models of historical investigation on the principles of Schleiermacher. His historical masterpiece is the 'History of Philosophy' (1829-53), which deals with general history up to the time of Kant. It was supplemented by a 'Review of the History of German Philosophy from the Time of Kant' (1853).

Ritter, Karl, German geographer: b. Quedlinburg, Prussian Saxony, 7 Aug. 1779; d. Berlin 29 Sept. 1859. He was educated at Halle, resided for a considerable time at Göttingen, in order to avail himself of its library, in 1819 succeeded Schlosser as professor of history at the Frankfurt Gymnasium, and in 1820 became professor extraordinary of geography at the University of Berlin, an office which he held with distinguished reputation for nearly 40 years. With Ritter may be said to have commenced a new epoch in geographical science; and a new department, that of comparative geography, claims him as its founder. His great work is 'Die Erdkunde im Verhältnisse zur Natur und Geschichte des Menschen' ('Geography in its Relations to Man's Nature and History'), the first two volumes of which appeared at Berlin in 1817-8, although it was afterward continued on a more extended plan, yet it was left incomplete, covering only Africa and Asia. It constitutes, so far as it extends, 19 vols. (1822-59), a vast repertory of valuable information rel-

ative to physical and general geography. Among other productions of Ritter may be mentioned 'Europa, ein geographisch-historisch-statistisches Gemälde' ('Europe Delineated Geographically, Historically, and Statistically,' 1807), and 'Die Stupas, oder die architektonischen Denkmäler an der indobaktrischen Königstrasse und die Kolosse von Bamyan' ('The Stupas, or Architectural Monuments on the Indo-Bactrian Highway and the Colossi of Bamyan,' 1838).

Ritual, in ecclesiastical usage, a manual containing the forms to be used by the priest in administering the sacraments, namely the communion (when given outside of the Mass), baptism, absolution, marriage and extreme unction; also in such rites as the churching of women, burial of the dead, blessing articles for religious uses, as water, candles, etc. The Roman Ritual now in universal use in the Latin Church was drawn up by order of Paul V., who, 1614, "counseled" all prelates to conform to its prescriptions exactly; but though the pope only counseled (*hortatur* is the word he employs in the bull *Apostolica Sedi*, a decree of the Congregation of Rites (1850) declares that the forms of the *Rituale Romanum* "affect the universal church." Before the issuance of the bull of Paul V. there were various ritual manuals authoritative in different countries or different episcopal jurisdictions. In the Eastern churches generally, as in the Greek Schismatical Church, the Ritual forms part of the general service book, the Euchologion, which corresponds to the Missal, the Pontifical and the Ritual of the Latin Church. The ritual of the Anglican Church is contained in the Prayer Book under the heads "Ministration of Baptism," "Order of Confirmation," etc.

Ritual of the Dead, one of the service books of the Roman Catholic Church in which are contained the prayers and the order of ceremonial used by that church in the administration of the sacrament and in certain other offices. The ritual occupies much the same position to the priest as the *Pontificale* does to the bishop. These directions are contained, in the case of the Anglican Church, in the Book of Common Prayer; in the Greek and some of the other Eastern churches the ritual is a part of the general collection. The Roman Catholic ritual now in use was made under the direction of the Council of Trent (Dec. 1545 to Dec. 1563), the need being felt for a unified ritual, to replace the various versions then in use. In 1614 Paul V. published an authoritative edition. This was often reprinted, and was revised and reissued by Benedict XIV. See BOOK OF THE DEAD.

Ritual Law, that portion of the law of Moses which prescribes the ceremonies of public religious worship, the manner of making trespass offerings, the procedure for the discovery of leprosy, for the purification of women after childbirth, the discrimination of things clean and unclean, etc. The ritual laws of the Hebrews are contained mostly in the books Exodus, Leviticus, Numbers and Deuteronomy.

Ritualism, a term designating the practices of a party in the Church of England and the Episcopalian Church in the United States and elsewhere, in surrounding the public worship with a variety of rites and ceremonies, and in

resuscitating certain features and usages of the Catholic Church in pre-Reformation times, such as the use of ornate eucharistic vestments, use of the sign of the cross, belief in the "Real Presence," prayers for the dead, treating the communion service as a real sacrifice, auricular confession, and many other beliefs and practices usually esteemed by Protestants as the insignia of "Romanism." By many, ritualism is held to be only another name for Puseyism and Tractarianism; but Dr. Pusey, at least, the reputed father of Puseyism, never adopted any of the practices of ritualism. The Ritualists defend their position against the charge that it is nothing but a revival of "Romanism" in the Protestant Church and that it is flagrantly inconsistent with the simplicity of Christian worship as portrayed in the books of the New Testament, by saying—what is undoubtedly true—that not all authoritative regulation of ritual is laid down in the New Testament, and that what is obligatory in ritual is to be learned from apostolic tradition. They allege, in explanation of the simplicity of primitive Christian worship, the secrecy and restraint to which the church was subjected through the ages of the persecution. All through that time the apostolic tradition was preserved by the church: on the accession of Constantine the ritual of the church assumed its natural beauty and proportions. And they cite the Anglican Book of Common Prayer in its original form as promulgated in the second year of Edward VI. (1549) as authorizing most of the practices now condemned by Protestants as ritualistic and "Romish." Their contention that the Episcopalian Church of England, with its daughter churches, is historically committed to the practices for which the Ritualists are censured, need not be considered here: it will suffice briefly to state some of the peculiar rites and usages which distinguish the Ritualists from the mass of Protestants whether in the Episcopalian or other churches. The Ritualists hold that the "altar" is a necessary part of Christian worship: the Book of Common Prayer, in the "order for the administration of the Lord's Supper," carefully avoids the word "altar" and says always "table." The Ritualists revived the practice of auricular confession and set up in their churches confession-boxes as in Roman Catholic churches. They brought back into use the eucharistic vestments—dalmatic, chasuble, cope, etc. The Puritans held the cross an abomination: the Ritualists set it on top of their churches and in the centre of the altar—and not only the cross but the crucifix. They restored also the use of incense in divine worship; and at the celebration of "the Mass" as they do not hesitate to call what in the Prayer Book is "the Lord's Supper" or "Holy Communion," they keep candles burning, as in Roman Catholic churches, even though the sun may be at meridian. And, what is more significant still, the Ritualists pay formal adoration to the "Real Presence" of Christ's body and blood, believed to underlie the species of bread and wine.

Ritualist, one who is zealous for strict observance of ritual; in particular, one who advocates the use of the rites of Catholic worship in the Established Church of England or in the Episcopal churches which derive from the Church of England. See RITUALISM.

Rivarol, Antoine, *āntwān rê-vā-rôl*, French satirical and political writer: b. Bagnols, 26 June 1753; d. Berlin 11 April 1801. He was one of the celebrated wits of the 18th century, possessing distinction, elegance and an astonishing facility in the expression of his thoughts that early gave him a position in the salons and at the court of Paris. His first work, which obtained a prize at the Academy of Berlin, was 'Discours sur l'Universalité de la Langue Française' (1784). The same year he published a translation of Dante's 'Inferno.' Later appeared 'Lettres à M. Necker' and in collaboration with Champcenetz, 'Petit Almanach des grands Hommes' (1788), a satire on the authors of his day. Becoming an émigré in 1792, he lived at Brussels, London, Hamburg and finally at Berlin, his works at this period being 'Lettres au Duc de Brunswick'; 'Lettre à la Noblesse Française' (1792); 'Vie politique et privée du Général La Fayette' (1792); also a preliminary discourse to a French dictionary (1797). In 1828 was published under his name a dictionary of the French language which was not written by him. His collected works were edited by Chénedollé and Fayolle in 1808.

Rivas, rê-vās, Nicaragua, a town between Lake Nicaragua and the Pacific Ocean, slightly northwest of the surveyed route of the Nicaragua Canal, and on the high road to Granada. It occupies the site of a Nicaraos Indian village. Pop. 6,000.

Rivé-King, rê-va'king, Julie, American concert pianist: b. Cincinnati, Ohio, 31 Oct. 1859. She is the daughter of Léon and Caroline Rivé, the latter a musician and her first teacher, and was married in 1878 to F. H. King. She appeared first in concerts at the age of six. Later she was a pupil of Liszt. She has appeared in over 200 concerts with Theodore Thomas and 80 with Seidl, besides in many independent recitals. She ranks among the foremost solo-pianists in America.

River Dolphins. See PORPOISE.

River Falls, Wis., city in Pierce County; on the Kinnickinnick River, and on the Chicago & Northwestern; about 60 miles in direct line west of Eau Claire and about six miles from the Mississippi River. It was settled in 1850 by a colony from New York, incorporated in 1856 and chartered as a city in 1885. It is in a productive agricultural region, in which wheat is the principal crop. The chief manufacturing establishments are flour mills, wagon works, and starch factory. The trade is mostly in grain, flour, and vegetables. The principal public buildings are the six churches and the schools. River Falls is the seat of a State normal school, and a high school, and has two graded schools. The bank has a capital of \$25,000. The government is vested in a mayor, elected biennially, and a council of six members elected annually. The city owns and operates the waterworks, and the electric light plant. Pop. (1890) 1,783; (1900) 4,503; (1910) 1,991.

River-hog, one of the African wild swine of the genus *Potamochoerus*, separated from the typical pigs (*Sus*) by the existence of a horny outgrowth from a bony protuberance above the canine in the male. This has been compared by Beddard to the osseous horn-cores of the extinct *Dinocera*. Five species are recognized, one in

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Madagascar, and the others in South and West Africa. The best known are the gray bush-bark or bush-pig (*P. africanus*) of Cape Colony, and the red river-hog (*P. porcus*) of the West Coast, remarkable for its vivid rufous coloring and long penciled ears. These pigs lead a half-aquatic life along the marshy borders of sluggish streams and in dense forests, but do great damage to the native plantations in some parts of the country, whence they are constantly killed off. Consult 'Proceedings' Zool. Soc. London, 1894, p. 92.

River-terrace. See TERRACE.

Rivera, José Fructuoso, hō-sā' frook-too-ō'sō rē-vā'rā, Uruguayan soldier and politician: b. Paysandu, Uruguay, 1790; d. Montevideo, Uruguay, 13 Jan. 1854. He fought in the numerous civil wars, rose to leadership, and when Uruguay established her independence became in 1830 first president of the republic. In 1835 he was succeeded by Oribe, and in 1836 headed a revolt against the president, which resulted in a civil war of two years' duration. Oribe was forced to resign, and in 1838-42 Rivera again served as president. In the latter year, Oribe, aided by the Buenos Ayres dictator, Rosas, invaded Uruguay, and in 1843 began the famous nine years' siege of Montevideo. Rivera moved to meet him in the field, but in 1845 was defeated at India Muerta by Urquiza, an ally of Oribe. In 1853 Rivera aided Flores in deposing the recently elected president, Giro, and later became a member of the executive triumvirate.

Riverhead, N. Y., village, county-seat of Suffolk County; on the Peconic River, at the head of navigation, and on the Long Island railroad; 67 miles east of New York. The village was first settled in 1690, and its growth during the first century was slow; in 1729 it was made the county-seat. During the War of 1812 a skirmish between men from some British vessels and the American militia took place near the village and within the limits of the township. It has a variety of industrial establishments, including grist mills, a woolen mill, planing and molding mills, carriage works, soap factories, and an organ manufactory. It contains the county court-house, the agricultural fair buildings and grounds, and has a high school with a school library. Pop. (1890) 4,010; (1900) 4,503; (1910) 4,706.

Rivers (Fr., *rivière*; Span., *ribera*; It., *riviera*; Lat., *riparius*, from *ripa*, bank, of or belonging to a bank), bodies of water of considerable size flowing with perceptible currents in definite channels, and usually without cessation during the year. Some water courses are designated as rivers although their beds are dry a part of the year. Rivers, obeying the laws of gravity, their waters seek the lowest level and eventually reach the ocean. The regions having rivers which do not flow into the ocean either directly or indirectly are parts of the earth's surface where the evaporation is so great that no overflow of water results from precipitation. Usually the overflow of a river discharges into another river, and perhaps a second or even a third discharge is made before the waters reach the sea. The Republican River of Nebraska and Kansas flows into the Kansas River in the State of Kansas, and the Kansas River

flows into the Missouri, the Missouri into the Mississippi, and the Mississippi into the Gulf of Mexico, which last discharges its waters into the Atlantic Ocean through Florida Strait and Yucatan Channel.

Origin.—Rivers are usually formed by springs or the gradual melting of the ice and snow which perpetually cover the summits of all the most elevated ranges of mountains upon the globe. Springs and ice are themselves due to the precipitation of water from the atmosphere in the form of snow, rain, mist, or dew. These fill the springs, lakes, or other reservoirs from which rivers flow by the natural gravitation of water to a low level. The union of various springs, or of these meltings, forms rivulets; these last follow the declivity of the ground, and commonly fall at different stages into one great channel called a river, which at last discharges its waters into the sea or some great inland lake. A new made river at first usually flows over the surface until it has worn itself a channel; or it may follow some depression or deformity in a mountainous region. Rivers are swollen during their course by the rain which falls on the surface. In temperate climates the source of supply tends to greater equality in the volume of the river than in torrid regions, where the evaporation is great. In the former the rains are not only more equally distributed in point of time, but also from a more protracted source of supply; part of the rainfall sinks into the ground and forms springs, part forms rills which flow directly into the river, and part feeds those rills with the drainage of the saturated ground long after the rain has ceased. As mountainous regions abound in springs, most rivers commence from a chain of mountains; each side of a chain also has its springs, and the rivers which originate on one side flow in the opposite direction to those which rise on the other. As it is the property of water to follow the most precipitous descent that comes in its way, the courses of streams point out the various declivities of the earth's surface, and the line from which large rivers flow in contrary directions generally marks the highest parts of the earth. This line need not, however, be of any great height; in European Russia, for instance, where the rivers are very extensive, the line which separates their sources is very little above the level of the Baltic or of the Black Sea.

Changes in Form and Size.—As soon as the stream begins to flow, its channeling and the deepening of its trough commences. If no obstructions prevented, the water would go on enlarging the channel, by widening and deepening. The nature of the soil, the softness or hardness of the rocks along its course, the amount of sediment it carries in its waters, and where this sediment is deposited all contribute to change of form and size. The erosive action of rivers on their beds is continually exercised, especially in the early part of their course; where the channel broadens as they approach the sea it may almost cease. Remarkable instances of erosive action are almost everywhere to be observed; but in no case is such action more striking than in the cañons or river-gorges in the Colorado region of the United States. There the rivers have hollowed out for themselves channels that present almost perpendicular rock walls on either side rising to the

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height of 6,000 feet for hundreds of miles. Such action is also seen where there is a waterfall, in which case the water gradually wears away the rock at the place where the fall occurs, and thus causes the latter to recede, as Niagara Falls. In perhaps every case a river has had much to do with the formation of the valley in which it flows. Rivers are very permanent features in the earth's history, and in some cases have hollowed out a channel through a mountain range gradually elevated across their source.

The size of a river depends upon two main circumstances,—the extent and character of its drainage area, and the degree of humidity possessed by the climate of the region from which it draws its supplies,—the latter being often dependent upon prevalent winds blowing from the ocean. The peculiar position of the Andes Mountains with respect to the rest of South America, the fact that by very far the largest proportion of its running waters are drained off in one general direction, toward the Atlantic, and the humidity of the climate, all contribute to the immense size of the rivers. The Andes being placed so near the coast of the Pacific, the rivers which flow into the Pacific Ocean are small; while those which flow on the other side, having such an immense space to traverse, are increased into a vast volume before they reach the Atlantic. The physical conformations of some continents are unfavorable to the accumulation of such vast bodies of water as the rivers of South America. Europe is not of sufficient extent; Africa has a climate which causes rapid evaporation and abounds in sandy deserts. A large part of Asia has not the humidity of the Amazon region, and its vast interior lakes serve as receivers for some of the large streams. The arrangements of its mountains conduce to long and somewhat narrow drainage areas. As the river goes on from year to year, in most cases it cuts a trench below the original constructional channel, and in time forms what is called a consequent valley. By means of the new constructional troughs many of the constructional lakes and the rivers become continuous streams, that increase the length as well as the depth of the channel. Where the waters pass from a hard to a soft rock, or from a resistant to a weak part of the material through which it is channeling, a greater slope is formed making rapids (q.v.) or falls (q.v.) or cascades (q.v.). The angle of the slope depends upon the difference in the degree of resistance of the hard rock in the old channel as compared with the soft rock in the formation channel. Gradually the channel is cut down close to the sea-level or base-level, and its course is over a gentle, gradual slope. The depth of the channel depends upon the dryness of the climate, softness of the rock, height of the land, and the volume of the stream. The dry climate really lessens the volume of the stream, and consequently it cannot force its way with the rapidity of a stream with greater volume even if the widths of the channels are equal. The river flowing through a region of hard rock will cut a deeper valley in a given time than the river of the same size and volume flowing through a region of soft rock; the latter will have a mass of detritus, an accumulation of waste from the weak rock, and it will need a vast volume of water or a steep

grade to do the same amount of channeling as the first mentioned river. Rivers flowing over comparatively low land, with drainage areas not much above the base-level have shallow channels, as in the southeastern part of the United States, especially in Florida. A river with a large volume of water has more power to carry off sediment, and even where the slope is gentle its momentum is greater than in that of the stream of a small volume of water. There are two causes for the shallow channels of the long rivers of the plains east of the Rocky Mountains; the dryness of the climate and the soft rock material through which they pass.

After a river has cut its channel to the base-line, then its grading really begins, the inequalities gradually disappear, or would disappear if there were no obstructions to the regular work. The constructional lakes and the waterfalls gradually disappear. The constructional lakes may disappear, but if the amount of detritus is large the channels lower down a stream, with a slight grade, may be filled, and thus the water will flow over a bed elevated above what was once its channel. Such channels exist in Ohio and in the plains of Lombardy. Any change in the depression or uplift of the land, whether from volcanic or other causes, will cause some change in the river. In various parts of Europe and the eastern part of North America, rivers have changed because of increase of evaporation, caused by the continued deforestation of their basins. New rivers often appear in the drainage area of a well defined river. There are several causes for this change; the consequent valley formed by the original stream will, in places, have a weak rock-mass through which the water will break and a lateral channel or ravine will be formed. The valleys formed by such streams are called subsequent valleys and the streams themselves are called subsequent streams.

The main stream with all the lateral streams and all tributaries, whether lakes or rivers, is called a river system. The land drained by a river system is called its basin. The system is usually known by the name of the main stream or trunk.

The rate of fall of many of the large rivers is not great. The Amazon has a descent of only $10\frac{1}{2}$ feet in 600 miles of its course—that is, one twenty-seventh part of an inch for every 1,000 feet of that distance. The Loire, in France, between Pouilly and Briare, falls one foot in 7,500 feet, but between Briare and Orleans only one foot in 13,596 feet. Even the rapid Rhine has a descent of no more than four feet in one mile between Schaffhausen and Strasburg, and of two feet between the latter place and the borders of Holland. The glaciers in France show a change in volume, and a consequent change in the size and rate of fall of the glacier-fed rivers. See NIAGARA FALLS; WATERFALLS.

Watersheds or Divides.—The line which separates the waters which flow into different rivers or different systems is called the watershed or the divide. The continental divide in the United States is the line which parts or separates the streams which flow into the Pacific from those which flow into the Gulf of Mexico through the Mississippi. Divides change from various causes. The subsequent rivers sometimes take the water from one system to

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another. The gradual removal of a constructional lake may change the divide, as in New York State, between the Mohawk River and Lake Ontario, in the Northwest between the Red River of the North and the Mississippi. The divides in many places are very low, as between the Amazon and Orinoco, and the Amazon and the Paraguay. The Orinoco at some distant period reached the basin of the Amazon, and has been subsequently connected with it through what is now an important branch, the Cassiquiare, which after a course of 120 miles from the main river discharges itself into the Rio Negro, a branch of the Amazon; and as the navigable waters of the Amazon approach within three miles to those of the Paraguay, there is with only this interruption a continuous communication by navigable rivers from the mouth of the Orinoco, in lat. 9° N., to the mouth of the Paraguay, in lat. 35° S.

Flood-Plains.—For various reasons many rivers overflow their banks at annual periods, others at irregular intervals. Such rivers usually carry a large amount of silt which at the time of an overflow is deposited on the land, thus enriching it. Great damage sometimes results from this overflow (see **LEVEES**; **MISSISSIPPI**), and various means have been devised to protect the lands adjacent to such rivers from inundation. The flood-plains of the Nile are noted for their fertility; the Mississippi, Amazon, Ganges, and many others have extensive flood-plains. The large rivers of Siberia have vast flood-plains caused by the thaws at the sources of the rivers when the lower portions are closed by ice. The descending waters sweep over the frozen surface carrying with them vast quantities of soil, detritus, and even forests. The Mackenzie in North America has flood-plains from the same sources as the Siberian rivers.

Mouths of Rivers.—The river which enters the ocean may have its channel submerged and the mouth becomes an estuary, or the tidal wave may crowd back its waters and the mouth becomes a fiord. In either case there is a constant battle for supremacy between the fresh water from the land-mass and the salt waters of the sea. Some of the sediment of the rivers is brought to the sea and either carried out into the ocean or deposited at the mouth of the river, where they form deltas. In some cases, as the Mississippi, the delta grows rapidly, extends out into the sea and becomes a part of the land-mass. The sediment annually brought down the Mississippi has been estimated as equal to a deposit of a foot in thickness over 12 square miles. The waters of the Ganges and Brahmaputra come more highly charged with sediment on account of their more rapid descent and the more violent rains that fall about their sources, and their deposits exceed many times those of the Mississippi. The sediments are spread out to a distance of 100 miles or more from the land, the waters of the Bay of Bengal being discolored by them even at this great distance. The quantity annually discharged from the mouth of the river has been computed equal to a layer one foot thick over a tract of 225 square miles. The Nile has a vast delta. The Mississippi, Nile, Ganges, Po, and many other rivers enter the sea by several channels. The Amazon enters by only one large channel, divided by an island, but the river widens out into a bay 180 miles wide. The delta-lands are

very fertile, and where the river channels have assumed stability, deltas have become valuable additions to the land-mass.

Economic Relation of Rivers.—The effect rivers have in supplying moisture to the adjacent lands, either by natural or artificial (irrigation) means is recognized by all nations. Their uses as contributing to the healthfulness of the climate and to modifications of temperature are well known. In the early history of all the nations on the globe, the waterways were the great thoroughfares which furnished means of intercommunication, and the rivers were largely instrumental in determining the location of the great commercial and industrial centres of the world. The great rivers of Europe and Asia, such as the Rhine, Danube, Volga, Indus, Ganges, Brahmaputra, Yangtse, and Ob, afford access to the sea to enormous populations. The Amazon, with its plain track extending for nearly 3,000 miles, is in many ways less like a river than a fresh inland sea; but the Mississippi and Saint Lawrence, though less extensive, are of greater value for carrying sea traffic to inland places. In their upper valley tracts, rivers are of use chiefly for transporting timber and driving machinery. It is interesting to note that in Switzerland, Norway, and Sweden, where there is no coal, there exist exceptional facilities for the use of water power on account of numerous mountain torrents.

LAW OF RIVERS.

General.—In law a body of water having a uniform current is generally termed a river. It consists of the bed, the water, and the banks or shores according as the stream is non-tidal or tidal. The law applicable to rivers and their use depends upon the country having jurisdiction over them. In the United States the use of navigable rivers is regulated by the laws of the United States, and by the legislatures of the States through which they flow. No general statement that is applicable to all streams, and which governs the use of all streams, can be made, and navigable and unnavigable rivers are not always subject to the same rules. In the United States, in the most approved and important sense of the term, navigable waters include all those having a channel which is useful for commerce. Such waters are public highways by common right. It has been said in construing the common law and in some of the earlier decisions of the courts that by navigable waters are meant all those in which there is a flow or re-flow of the tide. This definition may have been proper in England where there is no river of any considerable importance which has not a flow of the tide, but it would be unreasonable, in fact it cannot be applied in the United States where there are large rivers like the Mississippi, the Ohio, the Allegheny, the Delaware, the Hudson, the Schuylkill, the Missouri, the Columbia, and others that are very important for the purposes of navigation, and over which large business interests are transacted. To be navigable rivers, in the legal sense, commerce must be carried on over them which is of a valuable character. It is not necessary, however, that this commerce be carried on by means of boats; waters over which valuable commerce can be carried on are public highways for the purpose, even if they are used only for floating logs and rafts. Most of the authorities in America limit

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the term navigable waters to waters having an inherent capacity for navigation. Whether a river is navigable or not is generally a conclusion of fact and can be established by proof; but the courts in some States take judicial notice of the fact that some streams are navigable. In common law a distinction was made between waters navigable in law and those navigable in fact; those navigable in law being tide waters. The term is still used in this sense in England. By the civil law, waters that are in fact navigable are such in law, and a navigable river is defined as a *statio itinere navigio* (a place or way for navigation). In the development of American law the tendency of the courts has been toward the adoption of the civil law doctrines. Among navigable waters are two classes, termed Public and Semi-Public. The basis of classification is ownership. In public waters the soil beneath them is common property. The public have the right of navigation and all rights incident to ownership. Among them are fishing, gathering ice, sea-weed, sand, gravel, etc. All tide waters, including the sea and its arms and tidal rivers, belong to this class, and in many of the States all fresh-water rivers and lakes which have a capacity for valuable floatage are public. The non-tidal waters and the soil under them are private property, although the interest of the owner is qualified by being subject to the right of the public to pass over them.

Jurisdiction.—The right of navigation is subject to the control of the government, and the government has the right to improve rivers and harbors. In England this power was vested in Parliament. In the United States the authority of Congress under the commercial clause of the Constitution is paramount. In the absence of Congressional action, the power of the State legislatures is supreme; they may direct the improvements of navigable rivers, and may authorize improvements by individuals and by private corporations, and may levy tolls. Waters which lie within the borders of different States are generally subject to the concurrent jurisdiction of the States. The territory of States and nations when bounded by rivers, extends, unless otherwise agreed upon, to the centre of the streams.

Public Easement of Passage.—The public have the right of passage over all streams which have a capacity for that purpose, and this includes the right of navigation in boats and vessels, and of floatage as in the case of rafts and logs, and of travel over the ice. In common law the right to navigate waters above the tide was acquired by using the same. Now it may be granted by express act of legislature, but it is generally regarded as an inherent public right needing no legislative sanction. The legislatures of the States having jurisdiction, and Congress may make rivers and streams public highways for particular purposes when they are not public highways or navigable for other purposes. For instance, the Legislature may make a river a public highway for the purpose of floating logs, although it cannot be navigated by boats or vessels.

Use of Banks and Shores.—By the civil law the public have the right to use banks and shores of navigable rivers as appurtenant to the right of passage, and this is true of the States where that system prevails; but under the

common law the right to use the shores and banks by navigators was limited to high water mark and the right to pass over the waters does not include the use of banks for general purposes. But the public have the right of anchoring and of mooring on the banks against all except the owners of the banks. There is no public right at common law of towing on the banks. The owners of stranded property may go upon the banks for the purpose of taking it. In the use of rivers for navigation, the boats going down stream have a right to the centre of the stream or the centre of the current, and those going up stream must keep to the sides in passing. A descending boat may keep to the shore, but if she meets an ascending boat hugging the same shore and signaling her intention of keeping the shore, the boat going down stream must keep to the middle of the river. The rule is for the protection of vessels navigating up and down rivers crowded with boats to hold to the centre as nearly as possible. The rule both of statute and the general laws of navigation, which requires steamboats approaching one another to turn to the right applies to steamboats crossing a river, and ferry-boats crossing rivers making frequent trips, are obliged to use great care to avoid other sailing craft. Steamboats must keep out of the way of barges and flat boats floating down the river guided only by oars.

Rivers not Navigable.—Rights of Owners.—When a river that is not navigable forms the boundary of property, one half usually belongs to one proprietor and the other half to the other, the centre of the stream being the line between the owners of the lands on each side, and when the land on both sides belongs to one owner he is then the owner of the whole bed of the stream. This rule of law refers to the land under the water, and it is the property of the riparian owner as much as the banks of the river. The owner of the land has not an absolute ownership of the water, but he can use it for necessary purposes, as for the use of his family and house and to water his stock. If he takes more than the usual quantity and for such purposes as are not necessary, he is liable for damages to riparian owners farther down the stream in case they suffer damages. One owner of the land cannot change the bed of the stream to the injury of other owners; but if the line be changed slowly by accretion at one side, the line of ownership will still follow the centre of the stream. The rule might be different if, for any unforeseen and uncontrollable cause, the stream should burst its banks and make a new channel in a different place.

Fishing.—Each riparian owner has the right to fish in the waters on his own side of the river, subject to the fishing laws. It is customary, however, for owners of opposite sides of rivers to allow each to fish in the whole stream, for the convenience of both parties. Where the river bed is owned by the public and the river is navigable any person has a right to fish.

Accretions.—The owner of the land along the side of and under a river has the right to all deposits of alluvium along and upon his land. If an island is formed by accretions in an unnavigable stream, the ownership will be determined by the *filum aquae*, or centre of the stream, and it will belong to the parties owning

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the land on the side of the line on which it is formed. If the island is on the line, each will own his proportionate share.

Bridges.—Congress has power to authorize the erection of bridges over navigable rivers; the power may be exercised and authority given even when the bridges obstruct to a certain extent the free navigation of the rivers. States also have power to authorize the building of bridges over navigable waters within their boundaries, although they may to a certain extent interfere with navigation. This power in the States, however, is subject to the exercise of the power of Congress to regulate navigation. The proposition has come to be recognized as not disputable that but for the power granted by the Constitution to Congress, the State Legislatures would have as full and entire control of the waters of their several States as they have over the land. The States reserve all power not granted to Congress. The sovereignty over the waters of the States vests in Congress and in the several State Legislatures. Congress and the State Legislatures can provide for the erection and maintenance of draw-bridges over navigable rivers, and provide for the safe passage of vessels in the draws.

Boundaries.—When land along the bank of a river is described as being bounded on the bank or shore instead of the centre of the stream, then low water mark on the shore will usually be the boundary line. Where land is bounded by a common law navigable stream, that is, one in which the tide ebbs and flows, the boundary is the high water mark on the shore, and in some States in which there are large rivers that are navigable, although the tide does not ebb and flow, the boundary line is held to be low water mark. The proprietor has a right subject to government supervision to erect wharves and piers extending to low water mark or into the channel of the stream. In deciding what is low water mark, the ordinary rise and fall of the water is taken into account. There is not a unanimity of legal opinion in all the States upon the subject of the ownership of the beds of streams.

Dams.—The owner of land on both sides of a stream not navigable may erect a dam and swell the water of the stream or form a pond up to the line of the land of the next owner up the stream. An owner of but one bank cannot, without permission, erect a dam beyond the thread of the river. The erection of dams has been encouraged by the legislatures in many of the States on the ground of public policy. The right to erect dams has been given to riparian owners even when they flow the lands above them, and in some cases permission has been given to riparian owners to erect dams across the stream, although they owned land only upon one side. In these cases the statutes authorizing the erection of such dams have provided the method of assessing and collecting damages. Riparian owners on navigable streams, whether navigable by nature, or declared to be public highways by the legislatures of the States through which they flow, cannot erect dams across such streams without permission of the legislature having jurisdiction, or Congress. This permission is granted in some States by general law, and in others, as in New York, by special laws. The legislatures in granting permission to erect dams always

provide for ordinary navigation and for the maintenance of fishways. The right given by legislatures and by Congress to erect dams is not a protection against injuries to private owners. Such owners have a right to collect damages.

Ferries.—A ferry franchise is a right to transport passengers and property across a stream and to land at a particular place on its bank. In the United States this right is established by legislative authority. It is the creature of a sovereign power and no one can exercise it without the consent of the State. It is within the control of the government. In England the right was granted by the Crown, or founded upon prescription. A ferry franchise is real estate and can be sold like any other real estate.

Fishing.—Ordinarily any person may take fish out of navigable streams if he can do so without trespassing upon the lands of private owners. In most of the States of the United States as at common law, the exclusive right to fish is in the owners of the banks of rivers that are not navigable unless otherwise appropriated by statute. This right, however, is subject to legislative control. The preservation of fish in the waters of a State is of such public concern as to fall within the domain of legislative power. No owners of land have the right to obstruct the free passage of fish up and down the streams. The legislatures have the right to regulate the taking of fish from private rivers, which are unquestionably private property.

Floods.—Riparian owners who collect water on their land must keep such water under control at their peril, and dams erected for the purpose of confining water or creating ponds, must be constructed with such care and skill as to make them capable of resisting usual and ordinary floods.

Ice.—Water congealed is ice. Ice formed upon private waters, and that includes rivers owned by individuals, is real estate and is the property of the owner of the soil over which it is formed. In some of the States, however, as in Michigan, it is held as personal property and can be sold as personal property. After it is cut and removed it is always personal property. The owners of land bordering upon navigable streams in States where they are held to be public property, have no title to the ice which forms on such streams; such ice belongs to the first person who appropriates it, but generally ice forming upon private fresh-water streams belongs exclusively to the riparian proprietors and they may prevent others from removing it and maintain trespass against those who cut it without permission.

Irrigation.—The right to take water from streams passing over land owned by individuals is regulated by law, and differs in different States. The right, however, is generally recognized that there may be a reasonable appropriation, but no total diversion of the water.

When the State or the government intervenes and takes control of rivers for the purposes of irrigation, then the streams are to be used according to the laws enacted for the purpose. This is so as to the use of all rivers that can be used for the general good of the public. The courts have jurisdiction over questions arising out of the use of rivers. The United States admiralty courts have jurisdic-

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tion over causes of action arising in the large rivers as they do in the Great Lakes and the sea and coast waters.

Bibliography.—Lawson, 'Geography of River Systems'; Napier, 'Lakes and Rivers'; Ruffner, 'Non-Tidal Rivers of the United States'; Russell, 'Rivers of North America'; Wheeler, 'Tidal Rivers'; Morrill, 'Floods of the Mississippi River'; Edward, 'Thousand Miles up the Nile'; Keller, 'Amazon and Madeira Rivers.'

Riverside, Cal., city and county-seat of Riverside County: on the Santa Fe, Southern Pacific, and Salt Lake R.R.'s; about 60 miles east of Los Angeles. It was founded in 1870 by settlers largely from the New England States and New York, and was incorporated as a city in 1886.

Riverside is famous as the largest citrus producing and shipping point in the world, the annual output of the citrus fruits in Riverside County being over 8,000 cars, of which something over 1,000 cars are lemons, the balance being oranges (nearly 6,000 cars of this fruit are shipped from the city of Riverside alone). There are about 40 packing houses in the city where oranges and lemons are shipped, employing over 1500 persons at the height of the season. Alfalfa and deciduous fruits are also successfully grown, and there is a large grain-producing area in the county.

Riverside has one of the most extensive and complete irrigation systems in southern California. The climate is remarkably healthful and the place is famous as a health resort. The architecture of the public buildings has been largely developed along Mission lines, and among the famous buildings of this character are the Glenwood Hotel, the Carnegie library and the high school building. The courthouse is a single-story building built along classic lines, all on the ground floor, and cost \$250,000. Riverside is the seat of Sherman Institute, a United States Indian School, which has over 600 pupils.

There are three banks with a combined capital of \$250,000, and deposits of about \$3,000,000. The government of the city is vested in a board of trustees of five members, two chosen at one election and three at the next, elections occurring every two years. Pop. (1910) 15,212.

E. P. CLARKE,
Editor 'Daily Press.'

Rives, rêvz, Alfred Landon, American engineer, son of William Cabell Rives (q.v.) and father of Amélie Rives: b. Paris, France, 25 March 1830; d. 1903. He was educated at the University of Virginia and at the Ecole des Ponts et Chaussées, Paris, where he was graduated in 1854. He was assistant engineer in completing the Capitol at Washington, was engaged on the aqueduct there, and later was in charge of the United States survey for improving the Potomac River. He was colonel of engineers in the Confederate army during the Civil War, and was afterward manager of various railways and engineering enterprises.

Rives, Amélie. See TROUBETZKOY, A. R.

Rives, Hallie Ermini, American novelist, b. Christian County, Ky., 2 May 1876. She has published: 'Smoking Flax' (1896); 'As the Hart Panteth' (1896); 'A Furnace of Earth' (1900); 'Hearts Courageous' (1902); etc.

Rives, William Cabell, American legislator and diplomat: b. Nelson County, Va., 4 May 1793; d. near Charlottesville, Va., 26 April 1868. He was educated at Hampden-Sidney and William and Mary colleges, studied law, and in 1816 was a member of the Virginia constitutional convention. In 1817-19 and in 1822 he served in the State legislature, and in 1823-9 was a member of Congress. He was minister to France in 1829-32, and in that capacity negotiated the treaty of indemnity in 1831. He served in the United States Senate in 1832-4, 1835-45, and in 1849-53 was again minister to France. He was a member of the peace conference at Washington in 1861, and after the secession of the South sat in the provisional congress at Montgomery, Ala. He published 'Life and Times of James Madison' (1859-69).

Riveting Machines. See METAL WORKING MACHINERY.

Riviera, rê-vê-â-râ, a district bordering the Mediterranean coast, partly in France, partly in Italy, with Genoa as its central point. It extends to Spezzia on the east and Nice on the west, and is a favorite winter resort of invalids and others. The whole coast is traversed by a road and by a railway.

Rivière, rê-vê-âr, Briton, English painter: b. London, England, 14 Aug. 1840. He studied art under his father, a drawing master, worked at illustrating for many English and American publications and exhibited at the Royal Academy for the first time in 1864. He was elected A. R. A. in 1878, and R. A. in 1881. Among his most notable pictures, many of which have been engraved, are: 'Strayed from the Flock'; 'The Lost Sheep'; 'Legend of St. Patrick'; 'An Anxious Moment'; 'Circe'; 'Giants at Play'; 'Actæon'; 'Væ Victis'; 'Rizpah'; 'A Fool and His Folly'; etc. He is also known as a sculptor by his 'Anatomical Lion' (1888); 'A Dying King' (a lion, 1894); and 'The Last Arrow' (a lion-hunting scene, 1896).

Rivière du Loup, rê-vê-âr dü loo. See LOUISEVILLE.

Rivington, James, American printer: b. London about 1724; d. New York 4 July 1802. Early in life he was a bookseller in London, but in 1760 came to America, and opened a shop in Philadelphia, then in 1761 established himself in New York, and on 22 April 1773 began the publication of a newspaper entitled the 'New York Gazetteer, or the Connecticut, New Jersey, Hudson River, and Quebec Advertiser.' It was Royalist in sympathies and circulated among the Tories and gave to its publisher a position of some prominence. His affairs seem to have been under investigation by both the Provincial and Continental congresses, and he himself placed in temporary confinement. In November 1775, in consequence of his constant assaults upon the patriots, and especially Captain Sears, that officer came from Connecticut with a company of horsemen, proceeded to Rivington's printing office, destroyed the press, and converted the types into bullets. Rivington then went to England, and being appointed king's printer in New York, returned with a new press after the city had fallen into the hands of the British, and in October 1777 resumed the publication of his paper under the old title, soon changed to 'Rivington's New York Loyal Ga-

zette,' and on 13 December to the 'Royal Gazette.' About 1781, when the success of the British was becoming very doubtful, he played the part of a spy, furnishing Washington with important information. When therefore New York was evacuated, Rivington remained in the city and changed the title of his paper to 'Rivington's New York Gazette and Universal Advertiser.' The paper finally suspended publication in 1783, and he passed the remainder of his life in comparative poverty.

Rix, Julian, American painter: b. California 1851; d. New York 24 Nov. 1903. He used to say that he was "a pupil of nature," and appears to have had no regular academic training. He came to New York in 1888, and his work immediately attracted attention by its marked personal qualities. His California landscapes have been familiar ever since to all visitors to the exhibitions. His best paintings, among which are scenes in the Maine woods, were produced during the last five years of his life.

Rix Dollar, the English way of writing the names of different silver coins used in various European countries, as the *rigsdaler* of Denmark = 53 cents; the Swedish *riksdaler* = 27 cents.

Rizal, José, hō-sā' rē-thāl', Filipino patriot and author: b. Calamba, province of La Laguna, Luzon; d. Manila 30 Dec. 1896. He studied medicine at Manila, and was graduated from the University of Madrid as doctor in medicine and philosophy; studied farther in Paris, Heidelberg, Leipsic, and Berlin; made researches in philology and ethnology; and was elected a member of the Berlin Anthropological Society. Having returned to the Philippines, he was soon compelled to emigrate, owing to the hatred visited upon him by the old Spanish party on account of his story, 'Noli Me Tangere,' descriptive of political conditions in the Philippines. He then resided in Japan, North America, and London, where he prepared an edition of Morga's 'Sucesos de las Islas Filipinas,' originally printed in Mexico in 1609. On the continent he wrote another political novel, 'El Filibusterismo.' Subsequently he practised medicine at Hong Kong, and went to North Borneo, where he purposed to establish an agricultural colony of Filipinos. Though he had obtained permission to visit the Philippines, he was arrested on arrival there, and banished to Dapitan. On the outbreak of the native insurrection against Spain, he was accused of being its instigator; and on a third trial was condemned and shot. The proceedings against him have been described as farcical. He was undoubtedly the most talented Filipino of recent times.

Rizal, rē-thāl', Philippines, a province of the island of Luzon, formed by the consolidation of the former province of Manila (excepting the city of Manila) and the district of Morong, bounded on the east by the province of Infanta and the Bay Lagoon, and on the west by the Bay of Manila; area, 1,026 square miles. The surface, except that part of the former province of Manila which lies south of the Pasig River (q.v.), is mountainous, traversed by a number of short irregular ranges. There are many plains which, though fertile, are often inundated by the Bay Lagoon to the destruction of crops. In the western part of the province, the betel is grown extensively, especially in the

vicinity of the town of Pasay; other products of the province are rice, sugar, corn, and tobacco; there are also extensive forests. A fine variety of building stone is quarried on the island of Talim, in the Bay Lagoon. The industries other than agriculture include lumbering, fishing, and the manufacture of lime, mats, and clothing for native wear. The trade of the province naturally concentrates at the city of Manila, and the railroad from Manila to Dagupan, numerous roads, and the waters of the Bay Lagoon and the Pasig River provide means of communication between the different parts of Rizal and Manila. The province was created and civil government instituted in June 1901. Pop. 246,940.

Rizzi, rēt'sē, Antonio. See RICCI, ANTONIO.

Roach, rōch, John, American shipbuilder: b. Mitchelstown, Ireland, 1815; d. New York 10 Jan 1887. He came to this country in 1829, obtained employment in various iron works and foundries, became a machinist and finally erected a foundry of his own. Later he established the Aetna Iron Works, where he constructed the first compound engines built in the United States, and also built the largest engines which had been made in the country at that time. In 1871 he purchased the Rainer shipyards at Chester, Pa., enlarged the establishment until its value was estimated at \$2,000,000, and under the name of the Delaware River Iron Shipbuilding and Engine Works, of which he was entire owner, built a large number of merchantmen and also constructed the first ships for the new United States navy, among them the cruisers Atlanta, Boston, and Chicago, and the despatch-boat Dolphin.

Roach, a small European fresh-water fish (*Leuciscus rutila*), of the family *Cyprinidae*, related to the dace, chub, etc., and a favorite of anglers, because so much skill is needed in hooking it. It rarely weighs more than a pound, and is grayish or bluish green on the upper parts, lightening into lustrous white on the abdomen.

Roach, an insect. See COCKROACH.

Road-runner, a bird. See CHAPARRAL-COCK.

Roads, Improvement of, the rural highways of America are poor, probably the poorest that prevail in any country which has reached so high a state of civilization. Americans have excelled their competitors in other countries in nearly all industrial pursuits and methods, and have produced nearly everything required for the advancement of civilization in greater abundance and greater perfection than is to be found elsewhere in the world. The deficient highway system of the United States is now receiving the earnest attention of the people and they will soon excel in good roads as they have already done in so many other lines of development. In extenuation of the existing condition it must be remembered that the territory is extensive and the mileage necessarily great. Much of the country is still new, and, in the older States, the improper location of many roads has been a hindrance to their permanent improvement because it is evident to the people in many cases that the permanent improvement of these mislocated roads would result in a loss of money, and, therefore, they are inclined to wait for a

ROADS

re-location. In the western country roads are mostly located on section lines running with the cardinal points of the compass east, west, north, and south, one mile apart; but in the older States roads were not located on section lines nor on scientific principles.

Some people object to the disadvantages in the western country that result from following section lines, because sometimes they run against obstructions. But it is better to have roads located on section lines, as they are in the West, than to have them located at random, as they are in the East, where they are seldom direct in their course. There are many places in the old States of the East where you will not see a road, nor a fence, nor a property line, nor a building nor an object of any kind erected or located by the hand of man that corresponds with any of the cardinal points of the compass. The lack of any uniform principle in the location of the permanent improvements in a country leads to circuitous roads and needless labor in a community. In following section lines in the West some of the roads may be wrongly located, but, owing to the absence of any system in the East, nearly all are wrongly located.

In addition to the ordinary difficulties encountered in so vast a work as permanently improving the highways of a great country, it has been supposed by many of the people that the railway system, which has been developed to such a remarkable extent in this country, would prove to be a sort of substitute for the ordinary highway system. President Roosevelt, speaking to this point in an address which he delivered before the National Good Roads Convention at Saint Louis, Mo., 29 April 1903, said:

... Of course, during the last century there has been an altogether phenomenal growth in one kind of road, wholly unknown to the people of old—the iron road. The railway is of course something purely modern. Now, a great many excellent people have proceeded upon the assumption that having good railways was a substitute for having good highways. A more untenable position can not be imagined. (Loud applause.) What the railway does is to develop the country, and of course this development implies the need of more and better roads.

In the United States the composite nature of the government has often led to a doubt as to who should have jurisdiction of the roads and who should bear the cost of their improvement. Some have thought that the United States government should assume the burden, and, in the early part of the 19th century, it built a great national road from Cumberland, Md., to Saint Louis, Mo., and other national roads of less importance. (See *ROADS AND HIGHWAYS*.) Some have thought that the States should assume jurisdiction and bear the burden of cost required for improvement, and this is now being done to a great extent in New England and New York. But the prevailing opinion of the people heretofore has been that the counties or local communities should maintain jurisdiction and bear the burden of cost. So, for generations the people living in the rural districts and owning the agricultural lands have borne the entire burden and have made substantially all the roads of this country. This is a burden, however, that rests too heavily on the rural communities and which they are either unable or unwilling to bear, and, as a result of this fact, all permanent improvement has been retarded. We are now

passing through in this country what England passed through 200 years ago, that is to say, we are trying to require a portion of the community—those living in the rural districts—to build and maintain the roads for the use of all the people. This is an unjust proposition that cannot be maintained successfully in this country any more than in England or other European countries. Macaulay, in his 'History of England,' after describing the almost impassable condition of the rural highways of England during the closing years of the 17th century, says:

One chief cause of the badness of the roads seems to have been the defective state of the law. Every parish was bound to repair the highways which passed through it. The peasantry were forced to give their gratuitous labor six days in the year. If this was not sufficient, hired labor was employed, and the expense was met by a parochial rate. That a route connecting two great towns, which have a large and thriving trade with each other, should be maintained at the cost of the rural population scattered between them is obviously unjust; and this injustice was peculiarly glaring in the case of the great North road, which traversed very poor and thinly inhabited districts, and joined very rich and populous districts. Indeed it was not in the power of the parishes of Huntingdonshire to mend a highway worn by the constant traffic between the West Riding of Yorkshire and London. Soon after the Restoration this grievance attracted the notice of Parliament; and an act, the first of our many turnpike acts, was passed, imposing a small toll on travellers and goods, for the purpose of keeping some parts of this important line of communication in good repair. This innovation, however, excited many murmurs; and the other great avenues to the capital were long left under the old system. A change was at length effected, but not without much difficulty. For unjust and absurd taxation to which men are accustomed is often borne far more willingly than the most reasonable impost which is new. It was not till many toll bars had been violently pulled down, till the troops had in many districts been forced to act against the people, and till much blood had been shed, that a good system was introduced. By slow degrees reason triumphed over prejudice, and our island is now crossed in every direction by nearly thirty thousand miles of turnpike road.

In a government having a composite nature like that of the United States it is not always easy to determine just what part the General Government, the State government, and the local government should respectively take in carrying out highway work, though it is generally admitted that there should be co-operation among them all. Leaders in State politics, governors, and other high officials, are very reluctant to recommend to the people that they levy taxes or issue bonds sufficient to meet the great expense of making the roads what they should be. For the past 100 years the leaders in the various States have been reluctant to recommend that their States assume the burden of cost which is necessary. As a result of this policy the entire burden finally fell on the local communities, that is, the counties, parishes, townships, and districts; so it is true as a general rule and with slight exception that all the rural highways of America have been produced by the farmers of this country, the general theory and practice being that the people in the cities should pave their streets and the people in the country should build and maintain their roads. But this burden has rested so heavily upon the shoulders of the agriculturists that they have not been able to make the progress which is required in order that our highway system may keep pace with our industrial development. It seems to those who have studied the question that the burden is too heavy for the agriculturists to bear, especially in view of the decline in land and agricultural



THE ROAD BUILDER.



THE GOOD ROADS TRAIN.



GRADER AT WORK.

ROADS

products within the last 25 years. And the case appears stronger when you consider that during the last 25 years there has been a most remarkable concentration of population and wealth in the great cities. In all of the States east of the Mississippi and north of the Ohio a majority of the people are living in cities and much more than half of the wealth is concentrated there. If the policy is pursued of resting the entire burden of improving the highways upon the people of the rural districts, one half, and in some cases more than three fourths, of the wealth of the country wholly escapes this burden.

When practically all the people lived in the country and very few in the city, this system of taxation was a fairly just one; nearly all the people contributed. It was the intention of the founders of the government that this should be the case. But with the concentration of wealth and population the burden has been shifted, and a large proportion of those most abundantly able to bear the cost now escape. In order to re-establish in a measure the original policy whereby all the people should bear all the cost of improving the roads, it is necessary to adopt a different plan.

The State aid plan works well in the States where it has been tried. New Jersey, Massachusetts, Connecticut, and New York have tried it, and now Pennsylvania and Delaware have come to the front with State aid laws. The plan of State aid, briefly stated, is this: The State pays a fixed part of the cost of building roads out of the general fund raised by taxation of all the people and all the property in the State. Under those circumstances corporations, railroads, trusts and the various representatives of concentrated wealth in the cities, all contribute to this fund. When the appropriation of the money is made, however, the fund is expended in the rural districts, but it must be supplemented by money raised by local taxation. In the State of New York, which I believe has the best method of all, the State pays one half, or 50 per cent, the county 35 per cent, and the township 15 per cent.

This leads to a consideration of the wisdom of extending the principle involved in State aid so as to include the United States government. As already stated, the United States began by building certain roads and paying the total cost. Later this policy was reversed and the government did nothing. Under the early policy the government did too much, and under the later policy too little. A policy should be adopted under which the government will supplement the funds raised by State and local taxation. In States which have adopted State aid, the funds raised locally are supplemented by the State funds. So, on the same principle, the funds raised by State and local taxation, should be supplemented by a fund contributed by the General Government.

It is a remarkable fact that no country in the world has ever succeeded in producing a permanent system of well improved highways without the aid of the general government of the country. To the extent that the matter has been left to the local authorities, to that extent the roads have remained unimproved or deteriorated after improvement. It is true that the English government has never taken any portion of the imperial revenues to improve the roads in the United Kingdom; but it is also true that during

the closing years of the 17th century Parliament passed many acts giving exclusive jurisdiction of the roads named to turnpike companies, with authority to collect revenue by taking toll from all the people passing over the road. Subsequent acts finally placed all the principal roads of the kingdom under the jurisdiction of these turnpike companies; and so the burden of building and maintaining the roads was shifted from the shoulders of the local community to the shoulders of the traveling public, which in those days was obliged to pass over the common roads as there were no railways. This practice continued for nearly 200 years and was only recently changed by abandoning the toll gates and placing the repair of the roads again upon the shoulders of the local communities. But this has proven to be unsatisfactory and the roads are deteriorating under the new plan, which is really a return to the old plan that had been abandoned more than 200 years ago. It seems likely that half the cost of maintaining these roads will have to be paid out of the imperial revenues of the general government.

A comparison of the cost of transportation over the common roads of the United States with the cost of transportation over the macadamized or highly improved roads in Europe shows that it costs from two to three times as much to transport the products of the country over the unimproved roads of the United States as it costs to transport similar productions and tonnage over the improved roads of Europe. About 8 cents per ton per mile is the average cost on European roads; whereas in the United States the cost is about 25 cents per ton per mile. This question has been thoroughly investigated by different State governments and by the United States government with the following results: In 1893 the Highway Commission for the State of Ohio reported that the average cost per ton per mile in that State was 25 cents. In 1896 the United States government, through the Office of Road Inquiries in the Department of Agriculture, after an extensive inquiry covering 1,200 counties in nearly all the various States of the Union, reported an average cost of 25 cents per ton per mile; and the Highway Division in the State of Maryland in 1898 reported the cost per ton per mile to be 26 cents in that State.

The macadam road is the cheapest, most durable and most suitable for the permanent improvement of country highways of anything yet devised, developed or discovered. The value of this road consists largely in its cheapness and simplicity. Before the days of John L. Macadam it was thought necessary to lay a substructure of heavy stone under the superstructure of the finished road in order to support it. Macadam contended that the substructure of heavy stone was not only useless but harmful, and that a comparatively thin layer, not to exceed 10 inches, composed of the angular fragments of broken stones reduced to a uniform size, would make a better road than a greater mass underlaid with a heavy substructure. He would allow no stone of greater weight than six ounces to go into the road. He also insisted that these angular fragments without a mixture of any other substance would consolidate under the traffic of the road so as to form a crust, smooth, hard, and impervious to water. The earth itself, he said, must not only bear the weight of traffic passing over

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it, but the weight of the road itself, and the earth, when kept dry, is abundantly able to bear this weight; but if wet the foundation will sink irrespective of the heavy stone that may be laid in it. Isaac B. Potter, writing on this matter for the Good Roads Library, says of the origin and development of the macadam road:

The macadam road was not invented in a day. It is more a development than a creation. The roads of the ancients were often made of huge blocks of stone and some of them were laid to a depth of several feet, as though the stone itself were the main thing on which they relied to support their traffic. By and by it came to be noticed that large blocks of stone when placed at the surface of the road, soon became slippery; that the edges were soon rounded off; that this surface made an insecure footing for the horses' feet and a "bumpy," unpleasant roadway for travelers who rode over it. Then smaller stones, and in some cases gravel, was used as a top layer, but the large stones were still retained in the bottom of the road. When a new road was made huge trenches were dug to the full width of the roadway and sometimes several feet deep. In the bottom of one of these trenches large, rough stone blocks were laid, one layer on another, until the trench was nearly filled. Small stones were used in the upper layers and finally the finishing layer was composed of small broken stone or gravel. Some of these roads were very good, but they were all expensive and unreasonably so. Thousands of tons of stone, millions of wealth and endless labor were wasted in work that was wholly unnecessary and useless. Macadam rejected the method of Tresaguet which included a pavement of large, rough stones set on edge and adopted a method of construction which soon proved its excellence and made him famous. It has since been largely adopted by the engineers of France and other countries and is today the method almost wholly used in making country roads in France, Switzerland, Germany and England.

Nothing has marked the advancement in road building within the last generation as much as the application of labor-saving machinery, now used in road construction. In the days of Macadam the stone was all broken by hand and the process of consolidation was effected by the daily traffic as it passed over the road while in the process of construction. At the present time we have rock crushers for the purpose of reducing the stone to angular fragments; revolving screens for the purpose of separating the stone into different sizes, and from the dust, which is used as a filler and binder over the larger fragments. The power that crushes the rocks also elevates the resulting product into high bins, from which the road surfacing material is loaded into automatic dumping carts by gravity alone, and then these automatic dumping carts or wagons when driven to the road that is under construction are emptied of their contents by gravity and the material spread upon the roadbed at a uniform width and thickness by the forward motion of the automatic dumping carts or wagons as they discharge their loads. These angular fragments are crushed by machinery and separated by the automatic process without the hand of labor being applied in the ordinary manner, and are finally consolidated into a hard, smooth and impervious crust by the passing of a steam roller over the surface many times in succession after the mass has been sufficiently moistened by the application of water, which is generally done by means of an ordinary street sprinkler. So that the finished road may now be produced in a more scientific manner than ever before, but at the same time with greater economy and much less cost, because the application of machinery has been substituted for the primitive hand of common labor.

In addition to the improvements introduced

in the crushing, handling and consolidating of the mass of stone used in the macadam roads, there are many other useful inventions in the way of earth handling machinery by which the cost of grading and shaping the road-bed is much reduced. In addition to the macadam road there are various other kinds in use in the United States, among them being the chert roads common in the South, the brick roads common in the North, and the gravel roads common in both the North and South.

Bibliography.—Shaler, 'American Highways'; Gillespie, 'A Manual of the Principles and Practice of Road Making'; Byrne, 'Highway Construction'; Judson, 'City Roads and Pavements'; Aitken, 'Road Making and Maintenance'; Gillette, 'Economics of Road Construction'; Spaulding, 'A Move for Better Roads and Pavements'; Rockwell, 'Roads and Pavements in France'; Parnell, 'A Treatise on Roads'; Cardington, 'The Maintenance of Macadamized Roads.'

MARTIN DODGE,
Director Public Road Inquiries, United States Department of Agriculture.

Roads and Highways. Statesmen, diplomats, historians, and scientists agree that the most important element which lies at the root and beginning of a nation's progress, and that which is indeed the greatest part of the foundation of a country's civilization, is a system of good roads. Without this the national resources and energies remain to a degree unawakened and useless. Roads are the veins and arteries by means of which the circulation of the social body is carried on. Where they are clogged the march of civilization is retarded. The people have little in common. Unity of purpose finds little place with them. Limited opportunity for intercourse of any kind hurts their commercial prospects. The natives of a country entirely without roads would of necessity be simply savages. The absence of good roads would manifestly have retarded progress in the United States had it not been for the fact that the country and the locomotive practically grew up together.

Roman Roads.—The ancient Romans were the pioneer constructors of roads, and regarded them as of vital importance for conquest and the maintenance of their empire. They are said to have learned the art from the Carthaginians. Except where some natural barrier made it impossible, the Roman roads were almost invariably in straight lines. The substantial character of these early highways is well demonstrated by the fact that they have in some instances borne the traffic of 2,000 years without material injury. The Appian Way, the "Queen of Roads," reaches its magnificent distance of 350 miles out from the gray walls of imperial Rome, under arches of imperishable fame, past massive ruins, over weird catacombs, and has won a name for all time as the royal Roman road. The Appian Way was begun by Cæsar Appius Claudius, the blind, in the year 312 B.C., and reached to Capua, afterward being extended to Brundisium. Over the "Queen of Roads" passed the Apostle Paul, and other saints and martyrs have trod the imperial way over the Campagna, and under the arch of Drusus into Rome.

British Roads.—It was the boast of Great Britain 100 years ago that, beyond all rational

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1. Object Lesson Road, built by United States Government. Material, ordinary earth.

2. Typical State Road in New Jersey, built under the State aid plan by Hon. H. I. Budd, State Highway Commissioner.

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dispute, it stood at the head of the world's civilization, because no country on the face of the earth was so well provided with good roads. The length of pike-roads and highways in Great Britain in 1820 reached a total of 114,829 miles. These British roads were often the noblest exemplification of engineering skill, which subjugated and triumphed over great physical difficulties. Many of the British roads were carried over rivers, supported across ravines and hollows by stupendous embankments, driven underground through mountains, and sometimes terminating on piers extending far into the sea. The union of England and Scotland was due not to the kingly compact of 1707, but to the completion of a great highway between London and Edinburgh. This Great North Road, as it has been called, was later extended north from Edinburgh to the remotest extremity of Scotland—a distance greater than from London to Edinburgh. The North Road, which passes through Stamford, Doncaster, York, Durham, and Newcastle, is some 340 miles in length. Arched bridges, as a part of it, were built over the South Esk at Montrose, over the Don at Aberdeen, and over the Dean and the Tyne, the Findhorn, and the Lossie. For 37 miles the road follows the coast line entirely at Aberdeen, and thence strikes across country to Elgin, a distance of 67 miles. Notwithstanding that this section passes over much hilly country, it is so artfully conducted that hardly a single heavy grade is encountered the whole way. The good results of such a road were soon made manifest. The manufacture of coaches and private carriages was materially increased. Inns were established along the highway, the mails were carried more frequently and more quickly, the value of property was greatly increased, trade was promoted, and the general condition of even the poorest inhabitants was ameliorated by numerous accommodations and comforts which were formerly entirely beyond their reach.

The progress of civilization in India is owing largely to the military highway built by the British from Bombay to Calcutta. The English did much also for the interesting island of Jersey by building military roads across the island and around it in the year 1817. In Norway there are many important, well kept roads, and among them the great highway extending from Christiania to Leirdalsoren is conspicuously prominent. This road is 150 miles long and for the greater part of the distance winds through the mountains. The road systems of Austria, Switzerland, and some of the German states are vastly superior to anything in the United States.

Roads in France.—To-day France probably leads the world in a system of good roads. Although her area is only about four times as great as that of the State of New York, France has spent about \$600,000,000 in the construction of her common roads, and annually spends about \$18,000,000, or three per cent, of the first cost, in keeping them in repair. France has 87 departments, answering somewhat to our counties, and within these are various forms of local governments bearing some resemblance to those generally adopted in our cities and towns. The government maintains a large body of trained engineers in its special department of roads and

bridges, to which is entrusted the practical work of constructing and repairing the common roads. These comprise: first, national roads, which generally cross several departments, connecting important cities and towns; and second, department roads, which connect the chief cities and towns within the department. The less important roads are still further classified and divided, but the roads within a department are under charge of an engineer-in-chief, whose directions to his corps of subordinate superintendents and overseers must be implicitly followed. No part of the road system of France escapes attention, and every road is subdivided into sections varying in length according to its importance.

Chinese Roads.—Even in China, the great uncivilized, the public roads are in many ways admirable from their regularity, good condition, and comfort. Upon the government highways immense bridges have been built from mountain to mountain and over deep ravines. In the Alpine-like region of Xeu-si there is a government road built for the most part over bridges and along the sides of mountains at an enormous outlay of labor. This road is said to have been built under the supervision of a famous general and by his army of many hundred thousand men. In building imperial highways, as in the construction of their canals, the Chinese delight in straight lines, consequently mountains are leveled or tunneled and valleys filled up to meet the road requirements. In some provinces the public highways are flanked by rows of trees on either side, or by a wall eight feet high to prevent travelers from damaging the well-cultivated fields and gardens.

American Roads.—In America, the construction of extensive public highways in this country was begun so long ago as 1776, when the first artificial road was built from Philadelphia to New York, and later the famous stage road from New York to Boston. An often proposed grand boulevard from ocean to ocean had its genesis early in the century when Ohio asked for admission to the Union. It was then a debatable question whether emigration would be drawn to Ohio, from the fact that it was cut off from the seaboard at the east—the great Alleghany Mountains forming a barrier which seemed to be impassable. The natural highways then were the waterways, the navigable streams, but it was a very long distance down the Ohio and down the Mississippi, and the journey was attended with such risks and expense that it was deemed almost impracticable. In the Senate of the United States, Henry Clay devised the means. He suggested that when Ohio was admitted into the Union there should be set aside 20 per cent,—afterward reduced to 5—of the proceeds of the sale of public lands in that State, after deducting expenses, for the purpose of building a road to connect with the Ohio River the waters that flowed into the Atlantic Ocean. Among the appropriations that were designed by Congress to help and aid that work two were vetoed, but by the indomitable perseverance of Henry Clay, which won for him the appellation, "The Father of Public Improvements," he carried his plan to a successful termination. The road which was finally built was variously known as the Great Western or National Turnpike Road, the National Highway, and the Cum-

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berland Road, and connected the District of Columbia with the Ohio River. Commenced in 1806 and built at a cost of \$1,800,000, it was the first internal improvement of any magnitude undertaken at public expense. Before the close of the year 1831 over \$200,000 had been expended upon it in repairs. The road ran from between a point nearly opposite Steubenville, Ohio, and Wheeling, in West Virginia, through Ohio and Allegheny counties to Cumberland, thence through Cumberland and Washington counties and in Frederick County to Frederickton, all in Maryland. Connecting there was a road that led to Baltimore and one that led to Washington, D. C. The national road had a uniform width of 80 feet, and was afterward extended westward from the Ohio River to Indianapolis. Other highways followed this pioneer turnpike, and prominent among these was the Old State Road from Albany to Buffalo and thence westward through Cleveland to the prairie lands of the Mississippi Valley.

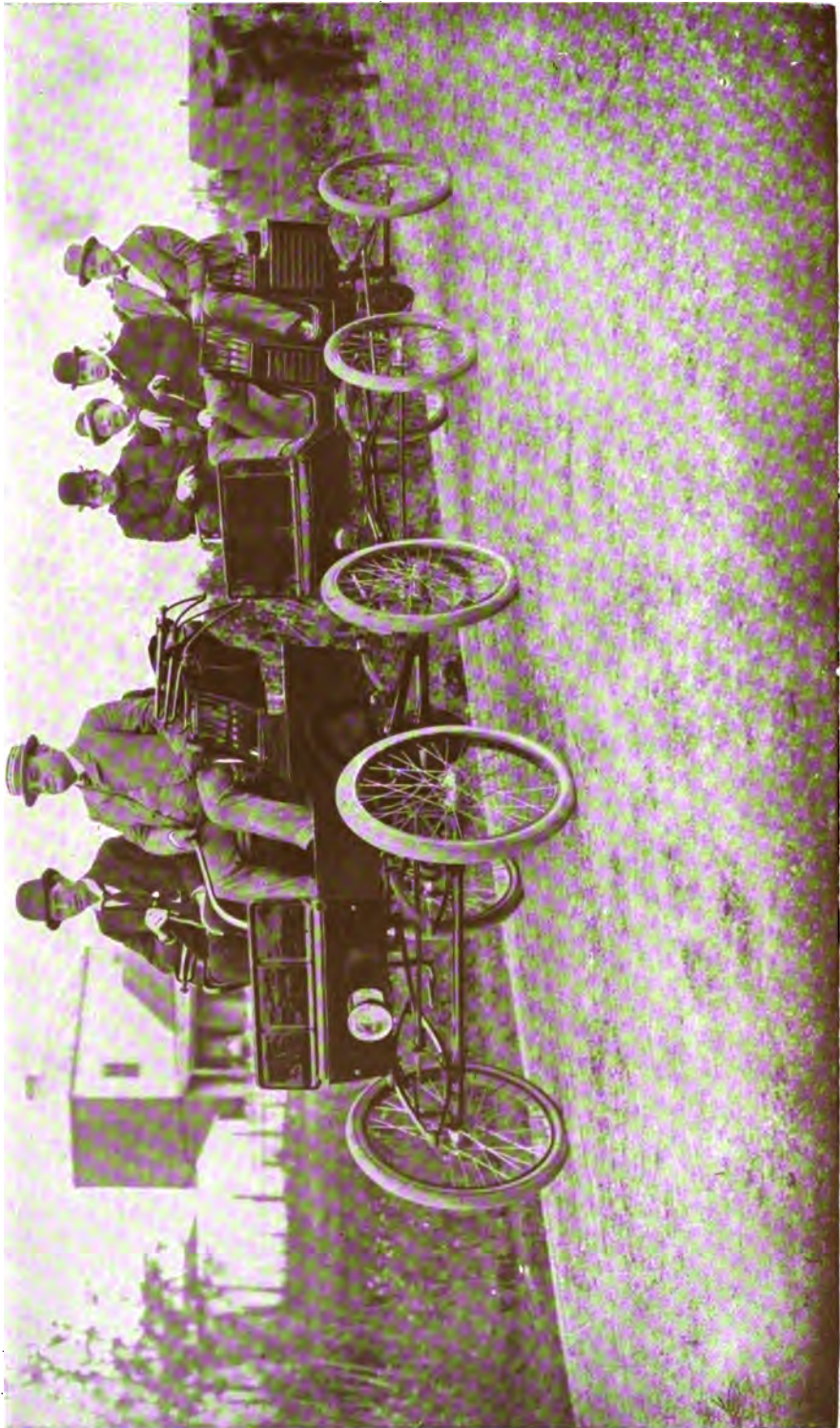
The Santa Fé Trail.—The original highway across the western prairie region was the famous Santa Fé Trail extending from Saint Louis to Santa Fé, N. M., and was first established early in the century. The people of Missouri in 1825, secured a congressional appropriation of \$30,000 for the building of a better wagon road to Santa Fé. I. C. Brown made the survey, but the road was never completed. The first Santa Fé Trail was directly westward from Independence, Mo., to the mountains of Colorado, and thence south to Taos, which is about 175 miles north of Santa Fé. Afterward, as the trade grew, another trail was considerably used, the route which was followed substantially by the Atchison, Topeka and Santa Fé Railroad. But the favorite "old Santa Fé Trail" was that along the Arkansas, thence across to the Cimarron, thence almost in a direct line to Wagon Mound, N. M., a conspicuous landmark, thence to Las Vegas, San Miguel, and Santa Fé. To the northward the pony express blazed the way across the plains to the Pacific coast, followed by the stage-coach and the wagon trains, and later the Union Pacific Railway marked the path of commerce that eventually brought the Atlantic and Pacific in close relation. From those pioneer days to the present the United States have been building roadways—north, south, east, and west—only when increasing internal commerce made it necessary, and the roads thus constructed were made cheaply and with no eye to the future.

Road Building.—The fact is patent that the United States government has practically wasted hundreds of thousands of dollars in repairing and maintaining poor roads, which is in itself another argument in favor of great national highways of proper construction. Measured by every rule of economy, the common roads of the United States constitute a poor investment and are the worst in the civilized world. For nearly a century the United States has been expending more in labor and money to carry on a system of inefficient and shiftless roadways than would be sufficient to keep in proper repair double the length of high class roads under the methods pursued by France, Italy, and other countries in Europe. In this almost hopeless struggle for road reform America has but followed in the footsteps and repeated the history of European

nations, where, in the beginning, the same obstacles were encountered and the same objections urged which meet the American to-day. Road building is in itself an art apart—a type of engineering accomplishment—to which few men have given more than brief study, and none, so far as we know, have made the subject a life-work. The properly built highway is something more than the work of an engineer, for it is a boon and a blessing to mankind and to civilization. Like a great poem, it will live in after years and bring fame to the man who has built intelligently and for all time. In the laying out of a new road the skill and ingenuity of the engineer are taxed to make the gradients easy, with as little expense as possible in excavating and embanking, without deviating much from the direct course between the fixed points through which the roads must pass. In order to do this, an accurate survey of the tract, including the relative levels of its different parts, and the nature of the strata, is a necessary preliminary. The formation of an extended line of road often involves the construction of extensive bridges, viaducts, and the like, which requires the greatest engineering skill. The best method for road building is a much debated subject among engineers, and there are many systems which are worthy of consideration. The great rival systems of Telford and Macadam are perhaps the most widely known, but the many systems afford a fascinating study for one interested in the welfare of mankind.

Ocean to Ocean Boulevard.—Considering the plan for a great national highway from ocean to ocean, a grand boulevard stretching from the Atlantic to the Pacific, the scheme appears so feasible that one marvels it was not accomplished long ago. The air-line distance from New York to San Francisco is 2,600 miles, and the railroad distance 3,370 miles. The railroads, in order to reach commercial, mining, and manufacturing centres, vary greatly from their natural route. A national ocean-to-ocean highway should traverse the distance in about 3,000 miles, starting from Boston and passing through the cities of Buffalo, Cleveland, Toledo, Chicago, Omaha, and Denver to San Francisco. The suburban system of boulevards in each of these cities will average 25 miles from east to west, making a total of 200 miles of a great national roadway already constructed. A hundred smaller towns and cities with well paved roadways, averaging from 2 to 10 miles from east to west, will add 500 miles, making in all scarcely more than 2,000 miles of roadway to be built. Of this 2,000 miles, fully 1,200 miles of roadway already exist in main-traveled highways from east to west, and these inland roads would be widened and improved. This would leave but something like 800 miles of roadway to be bridged, blasted, or filled. In the event of a national highway being built across the continent, it has been suggested that convict labor be employed in the construction of the road, each State adding its quota. Heretofore, there has been great objection to this class of labor in almost every line of work, on account of the feeling that convicts employed in this way deprive free labor of its function. This is universally true except in road building, for on account of the great expense coincident with the employment of free labor, no State has un-

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CAROLLTON AVENUE, NEW ORLEANS.

The same section of road as that shown on accompanying plate. This picture was taken April 27th, when in a day, a mile of impassable roadway had been converted into a model street.



CARROLLTON AVENUE, NEW ORLEANS.

This street, on the outskirts of the city, was chosen for improvement. The picture was taken on the morning of April 26th before the experiment was begun

ROAN ANTELOPE — ROANOKE ISLAND

dertaken to build roads to an extent great enough to require a large amount of it. Convicts have been used abroad in building many important local and national works. The great docks at Liverpool, which virtually made that city famous, were constructed entirely by such labor. It is safe to say that these huge structures would never have been built had the work necessitated the employment of free labor with its accompanying cost. Time need be given little consideration in the construction of an ocean-to-ocean boulevard. In this age of rapid construction the element of time is practically annihilated. That far-famed monument of antiquity, the Great Wall of China, was completed within a space of five years, and the length of this great wall is upward of 1,500 miles. The country over which it passes is wild and hilly, and in some places it is built on the steep sides of mountains between 5,000 and 6,000 feet above the level of the sea. The wall crosses rivers and valleys, and in some places large tracts of marsh land were great obstacles to the architects, but all these difficulties were overcome. To accomplish this work the power of a despotic emperor was exerted, and every third man in the kingdom was forced to labor at the undertaking.

WILL M. CLEMENS,

Editorial Staff, 'Encyclopedia Americana.'

Roan Antelope, a large and handsome South African antelope (*Hippotragus equinus*), related to the exterminated blaubok and the beautiful sable antelope, which is of a reddish hue, with strong black and white markings on the face. It is becoming very rare.

Roanne, rô-ân, France, town in the department of the Loire and an important railway junction, 59 miles by rail northwest of Lyons. Extensive engineering work shops are located here, besides iron and copper foundries, many dye-works, pottery and tile works. Pop. about 36,000.

Roanoke, Va., city in Roanoke County; located on the Roanoke River and on the Norfolk & Western railroad, 53 miles west of Lynchburg. Roanoke was formerly a leading tobacco market, but in later years has become the centre of a large section rich in iron mining and farming interests.

Industries.—Roanoke has extensive iron manufacturing interests, rolling mills, tobacco factories, bottling works, box factories, locomotive and car shops, canning factories, wheel and spoke factories, machine shops, saw mills, planing mills, wooden-ware factories, knitting and silk works, iron furnaces, bridge works, foundries, rolling mill, cotton mill, carriage and wagon factories, and many smaller industries. It had an assessed real property valuation in 1910 of \$9,539,696; personal property, \$2,510,643; corporations, \$13,688,750.

Public Buildings.—The Virginia College for young ladies and the National Business College for both sexes are located here, and the famous Hollins Institute for young ladies is located within seven miles of Roanoke. There is also a very fine high school, and grammar and other schools, court-house, city-hall, Academy of Music, and numerous fine business blocks.

Government.—The city is governed by a mayor and city council elected by the people. There is an excellent paid fire department and

electric street railways and electric lights. The city has an improved sewer system and two waterworks plants. There are several national and State banks, excellent hotels, daily and weekly newspapers and monthly periodicals.

Population.—Roanoke was incorporated in 1884, and has grown steadily in population and wealth. At that time the population was 5,000; in 1890 it had 16,159 inhabitants, and in 1900 this had increased to 21,495. The population in 1910 was 34,874.

E. B. JACOBS,

Secretary Roanoke Chamber of Commerce.

Roanoke, a river in Virginia and North Carolina, formed by the confluence of the Dan and Staunton rivers at Clarksville, Va. It flows south and southeast for nearly 300 miles, entering the Atlantic Ocean through Albemarle Sound. It is a tidal stream fully 80 miles from its mouth and is navigable to its source. The Dan and Staunton are navigable for small vessels for some distance from the Roanoke. At Halifax, N. C., there are rapids and falls which furnish considerable water-power. A canal has been built around this obstruction to navigation.

Roanoke College, located at Salem, Va. It was established in 1853 under the auspices of the Evangelical Lutheran Church, and is governed by a self-perpetuating board of trustees. It offers a classical course, leading to the degree of A.B., and a business course, and has also a preparatory department. It is coeducational, but few women have enrolled. The college possesses a numismatic collection of considerable value, a library with 24,000 volumes (in 1910); and grounds and buildings valued at over \$100,000. The productive funds amount to \$136,500, and the annual income in 1910 was \$29,000. The students numbered 210, and the faculty 19.

Roanoke Colony, The, in American colonial history, the name applied to a famous land grant of the crown. In 1584 Sir Walter Raleigh, having obtained a large grant of land from Queen Elizabeth, sent out 9 April, seven vessels and 108 settlers under the command of Sir Richard Grenville. After skirting the West Indies and Hispaniola, they landed at Roanoke, in North Carolina, 20 June. Ralph Lane was left in charge of the settlement and Grenville returned to England. During the following winter Lane made numerous exploring expeditions and suffered greatly from Indian attacks. In the spring he received some aid in men and supplies from Sir Francis Drake, but finally the settlers persuaded Drake to take them home. Soon after Grenville arrived with new settlers. These had been destroyed by the Indians when, in 1587, a new colony of Raleigh's, under White, came out. White himself returned to England. When he came back (1590) he found the colony vanished. It seems to have been destroyed by the savages, though there is a theory that descendants of the colonists are still to be found among North Carolina half-breeds.

Roanoke Island, Battle of. After the capture by Union troops of Forts Hatteras and Clark, at Hatteras Inlet (q.v.), 29 Aug. 1861, the Confederates began to erect works on Roanoke Island, to command the narrow channel connecting Albemarle and Pamlico sounds, considered as the key to one third of North Caro-

ROARING — ROBBER-FLY

lina, the possession of which by the Union forces would enable them to reach the railroad connecting Richmond with New Orleans. The Union authorities decided to seize the position, and 7 Jan. 1862 Gen. Burnside, who had a division of 12,000 men, was ordered to seize and hold Roanoke Island, capture Newbern and Fort Macon, open the harbor of Beaufort and, if practicable, to advance from Newbern and seize the railroad to Goldsboro. On 7 January vessels carrying the troops set sail from Annapolis, and by night of the 10th more than 80 vessels of all kinds had rendezvoused at Fort Monroe, 20 being war vessels, carrying over 60 guns, under command of Flag-Officer L. M. Goldsborough. The fleet was divided into two columns under Commanders S. F. Hazard and S. C. Rowan. The expedition sailed from Fort Monroe on the night of the 11th, and after many mishaps, in which some vessels were lost, by 4 February had passed into Pamlico Sound, and orders were given for the advance on Roanoke Island. On the morning of the 5th the start was made, with 65 vessels in all, naval vessels and transports. On the 7th the armed vessels engaged the Confederate batteries on the west side of Roanoke Island, and also small gunboats, which were soon driven off. The forts were silenced and on the morning of the 8th Burnside had over 8,000 troops and a battery ashore at Ashby's Harbor. Confronted by Confederate works, manned by nearly 6,000 men, he had formed his division into three brigades, commanded by Gens. J. G. Foster, Jesse L. Reno, and John G. Parke. The advance was ordered early in the morning, Foster leading, in the centre, Parke on the right and Reno on the left. While Foster pressed the front and engaged with his artillery, Reno, marching at times waist-deep in the mud of the swamps, gained the right of the Confederate position, Parke, in the same manner gaining the left, and, after a more than three hours' fight, a simultaneous charge was made and the entire position carried. This cleared the road. Burnside marched to the head of the island, where the forts on the shore and their entire garrisons were captured. The Union loss was 37 killed, 214 wounded, and 13 missing. The Confederate loss was 23 killed, 58 wounded, 62 missing and about 2,650 captured, including 159 officers. The Confederate gunboats went up Albemarle Sound to Elizabeth City, pursued next morning by Commander Rowan, with 14 vessels. Rowan promptly attacked, and after a short but severe engagement, Lynch, the Confederate commander, ordered the abandonment of his boats, ran them aground and set them on fire. Rowan had 2 killed and 6 wounded. Having gained entire possession of Roanoke Island and the control of the inland waters of North Carolina, Burnside's next step was the capture of Newbern (q.v.). Consult: 'Official Records,' Vol. IX.; the Century Company's 'Battles and Leaders of the Civil War,' Vol. I. See NEWBERN, OPERATIONS AT, IN THE CIVIL WAR.

E. A. CARMAN.

Roaring, a disease of horses whereby the air-passages are partially obstructed, giving rise, when the horse is briskly exercised, to a peculiar noise in breathing. The disease is due to inflammation of the larynx or of the windpipe, with wasting or paralysis of some of the laryn-

geal muscles, whereby the glottis becomes contracted. The fluid discharged from the affected parts, changing into a tough, viscid substance, adheres to the larynx and upper part of the windpipe and further obstructs them. But the specific causes of roaring are various. It sometimes follows strangles. Carriage-horses are more subject to it than saddle-horses, and this is explained by the injury done to the larynx by tight reining. There are also various kinds of roaring, distinguished by the sounds, as whistling, wheezing, high-blowing, and piping. The disorder does not appear to be amenable to treatment, though in early stages, as when it proceeds from catarrh or influenza, it may be relieved by blisters or setons. The disease renders a horse unsound, as it unfits him for the ordinary strain of work.

Roaring Forties, a sailor's term for a region of the great Southern Ocean lying south of latitude 40° to 45° S., where strong and often stormy west-northwest winds prevail. Owing to these winds the outward voyage to Australia by sailing vessels is made via the Cape of Good Hope and the homeward voyage via Cape Horn. The same name is sometimes given by analogy to a belt of the North Atlantic about 40° to 50° N.

Roasting. See COOKERY.

Rob Roy (Robert the Red), Roy, or Gael Ruidh, meaning "red"; Scottish Highland freebooter: b. Buchanan parish 1671; d. Balquhider 28 Dec. 1734. His true name was Robert Macgregor, but he assumed that of Campbell, on account of the outlawry of the clan Macgregor by the Scottish Parliament in 1693. He was a trader in cattle previous to the rebellion of 1715, in which he joined the adherents of the Pretender. On the suppression of the rebellion the Duke of Montrose, with whom Rob Roy had previously had a quarrel, took the opportunity to deprive him of his estates; and the latter began to indemnify himself by a war of reprisals upon the property of the duke. His was a lengthy and eventful career with many hair-breadth escapes from his enemies. Consult: Sir Walter Scott's 'Introduction' to his novel of 'Rob Roy' (1818) for a full account of this chieftain, interest in whose name was aroused largely by that work; also lives by Macleay (new ed. 1881) and Miller (1883).

Robber Council. See EUTYCHES.

Robber-fly, one of the slender and long-bodied but strong and active flies of the family *Asilidae*, which prey upon many kinds of insects, by darting upon them, and stabbing them with their dagger-like beaks. These instruments are armed at the tip with bristles which prevent the victim from escaping until his death is accomplished. Some species might easily pierce a man's skin, but do not do so, nor attack cattle. They are an enemy to be dreaded by bee-keepers, however, as they attack bees and where numerous may seriously interfere with their disposition to gather honey or even prevent swarming. Hence a common name is "bee-killer." Some of them resemble wasps, to whom their evil deeds are often attributed. They lay their eggs in earth-mold or rotten wood, and the larvæ live in the ground where they prey upon insects and their eggs. Over 3,000 species are known, of which about 400 are American. Consult Howard, 'The Insect Book' (New York, 1901).

ROBBER PALM — ROBERT

Robber Palm, or **Cocoonut Crab**, a large and powerful land-crab (*Birgus latro*) of the East Indies, related to the hermit-crabs, which lives in a hole in the earth under trees, lining its burrow with the fibrous cocoonut husks, has an almost lung-like modification of the gill-cavity for breathing air directly, yet visits the sea annually in droves to spawn. It goes abroad only at night and feeds on cocoonuts, though it does not climb for them, and is itself eaten in Amboyna and elsewhere. Darwin has graphically described how it tears the husk from the cocoonuts, and hammers on the round depressions at one end until entrance is effected. Consult Forbes, 'A Naturalist's Wanderings' (1885).

Robbery, is the wrongful taking, without a claim of right, of a thing of value from one's person against his will, or by force, or through placing him in fear. In the United States the offense is regulated by the statutes of the various jurisdictions, in some of which the degree of guilt depends on the nature of the act. Actual force need not be employed to induce fear, and fear may extend to a threatened destruction of one's property, or injury to reputation. The law does not hold that the property must be in the actual physical possession of one, or in contact with his person, but merely that it must be in his presence, or in his immediate control; the property need not belong to the person from whom it is taken. Two or more persons may be equally liable for robbery if participating in any of the acts by which it is carried out. Punishment for robbery is fixed by statute.

Robbia, rōb'bē-ā, **Luca della**, Italian sculptor: b. Florence 1400; d. 1482. In the Early Renaissance he appeared as the foremost artist of all his contemporaries, and created a new school of sculpture by his marble friezes for the organ-loft of the Duomo at Florence. These are still to be seen in the Bargello Palace of the same city. The work was completed in 1445 and represents in ten panels angels and boys, singing and playing on various instruments, to the rhythmic movement of the dance. For refined and chastened fancy, skilful grouping and animated expression this masterpiece showed a vast advance on the hieratic sculptures of mediævalism. The enthusiasm with which it was greeted was redoubled, when in conjunction with Michelozzo and Maso di Bartolommeo, he executed the bronze doors for the Old Sacristy of the Duomo (1446-64). His name is, however, especially associated with works in clay reduced to pottery in the kiln, and colored and glazed like faience. This faience sculpture was unknown before his time and in it he improved the common process of glazing by a new method all his own. Numberless were the reliefs, medallions, tympanum groups, altars and other decorations which he and his pupils produced in this style. He began by plain white reliefs on a flat blue ground; the flawless beauty of his profiles in many sculptures of this kind have been the inspiration of succeeding artists. But he gradually enriched the coloring by the addition of other tints, some critics think, with a loss to classic purity and simplicity; yet the harmonious composition of his designs, the charm of expression which appears in everything he did, added to the boldness with which he ventured into a new field of plastic art have won

for him a sort of unique glory among the artists of the Renaissance. His works and those of his pupils are met with in every part of Tuscany, and some examples may also be seen in the museums of Europe. Among his most eminent pupils were his nephew, Andrea della Robbia (1437-1528); and the sons of this latter, Giovanni (1469-1529); and Girolamo (1488-1566). Consult: Barbet de Jouy, 'Les Della Robbia' (1855); Cavalucci et Mohnier, 'Les Della Robbia' (1884); Leander Scott, 'Luca Della Robbia' (1883).

Robbin, rōb'in, **Albert Farthing**, English writer: b. Launceston, Cornwall, 1 Aug. 1856. He entered journalism in 1871 and has long been London correspondent of the *Birmingham Post*. In addition to several comedies and other dramas he has published 'Practical Politics or the Liberalism of To-day' (1888); 'The Early Public Life of William Ewart Gladstone' (1894); etc.

Robbins, rōb'inz, **Wilford Lash**, American Protestant Episcopal clergyman: b. Boston, Mass., 7 Aug. 1859. He was graduated from Amherst in 1881, studied at Cambridge Theological Seminary, was ordained deacon in 1884 and held his first charge at Lexington, Mass., where he was advanced to the priesthood in the following year. He was appointed dean of the Cathedral of All Saints at Albany 1887-1903 and in the year last named became dean of the General Theological Seminary. He has published: 'An Essay Toward Faith' (1900); 'A Christian's Apologetic' (1902); etc.

Robert I., king of Scotland. See **BRUCE**, **ROBERT** (3).

Robert II., king of Scotland, son of Walter III., steward of Scotland, and Marjory, daughter of Robert Bruce: b. Scotland 2 March 1316; d. Dundonald Castle, Ayrshire, 13 May 1390. He was recognized as heir to the Scottish throne by Parliament in 1318, but superseded by a son afterward born to King Robert, who succeeded him in 1329 under the title of David II. In 1333, Robert, then steward of Scotland, was a leader at Halidon Hill and in 1334 was appointed joint regent with Moray. In 1338-41 he was sole regent and after the battle of Neville's Cross in 1346, where King David was taken prisoner, was again made regent. After the death of David in 1371 Robert was declared king and was crowned shortly afterward, the first of the Stuart dynasty. He ratified a treaty with France in the first year of his reign, and continued a nominal truce with England until the succession of the English king, Richard II., with whom he waged two wars. In the latter of these Richard II. and the Duke of Lancaster made successful forays into Scotland. In 1388 these were avenged by an invasion of England by two armies and the famous battle of Otterburn (Chevy Chase) was then fought. The long continued border wars and the disorders caused by the turbulent barons caused the king, whose increasing age disinclined him to the arduous duties of reigning, to entrust the management of the kingdom to his second son, the Duke of Albany, in 1389, and he then retired from public life.

Robert III., king of Scotland, eldest son of Robert II.: b. Scotland, about 1340; d. Rothesay, Bute, 4 April 1406. He was originally known as John Stuart, Earl of Carrick, but assumed

ROBERT — ROBERT OF MOLESME

the name of Robert on his coronation in 1390. He possessed little strength of mind and incapacitated for military service by his lameness, delegated, therefore, the guidance of military affairs to his brother, the Duke of Albany. The friends of the king's eldest son, the Duke of Rothesay, forced the abdication of Albany in 1398 and war was renewed with England. Scotland was invaded for the last time by an English king in 1400, and in 1402 the Scottish troops met with disastrous defeat at Homildon Hill. Albany then regained the regency, imprisoned Rothesay at Falkland Castle, where he starved him to death, and caused Robert III., in his terror of him to send his second son James to France for safety. James was captured and imprisoned by the English and his father on learning of the event went into melancholy and died soon after. Scott's 'Fair Maid of Perth' is based upon various incidents related above.

Robert, Duke of Normandy, surnamed **THE DEVIL**: d. Nicæa, Asia Minor, 22 July 1035. He was the younger son of Duke Richard II. and ascended the throne in 1028 in succession to his brother, Richard III., whom he was said to have poisoned. The earlier years of his reign were passed in the subjugation of his vassals. Then he interfered in various princely quarrels, restoring Baldwin IV. of Flanders to his estates, and aiding Henry I. of France against the plots of the latter's mother. In 1034 he undertook an expedition against England, in support of his nephews, whom Canute had excluded from the succession, but his fleet was wrecked off Jersey, and the attempt failed. He now set out on a pilgrimage to Jerusalem; and while returning died suddenly in Nicæa, poisoned, perhaps, by his servants. His heroic deeds and penance have given rise to numerous stories. 'La Vie du terrible Robert le Diable, lequel fut après l'Homme de Dieu' appeared in 1496, and was much imitated. On it was based the grand opera, 'Robert le Diable,' text by Scribe and Delavigne, music by Meyerbeer. William the Conqueror was his son. Consult: Tardel, 'Die Sage von Richard dem Teufel' (1900).

Robert, Henry Martyn, American military engineer: b. Robertsville, S. C., 2 May 1837. He was graduated from West Point in 1857, was assistant professor of philosophy, and later of military engineering there in 1857-8 and served on frontier duty 1858-61. He was on the staff of General McClellan and on duty as an engineer through the Civil War, was promoted captain in 1863 and served as professor of military engineering at West Point in 1865-7. In 1867-95 he was on duty in connection with river and harbor improvements, lighthouses and fortifications. He was made president of the board of engineers for fortifications in 1895, was promoted brigadier-general chief of engineers in 1901 and was retired shortly after. He has published 'Robert's Rules of Order' (1876).

Robert, Louis Leopold, French painter: b. Les Eplatures, near Chaux-de-Fonds, Switzerland; d. Venice 20 March 1835. His teachers were the copperplate engraver Girardet in Paris, and the painter David. In 1818 he visited Rome and the study of life among the common people there furnished material for some of his smaller genre pictures. He was especially happy in his representation of robber life in Italy, and his

'Sleeping Brigand' in the National Gallery at Berlin is much admired. But it was at Naples that he found material for his first masterpiece 'The Improvisator' (1823). This was succeeded by 'The Return from the Festival of the Madonna' (1827), now in the Louvre; 'The Arrival of the Reapers in the Pontine Marshes' (1830) in the Louvre; of which latter a replica with variations is in the Berlin National Gallery. In 1832 he visited Venice and completed 'The Departure of the Fishermen of the Adriatic.' An unrequited attachment for the Princess Charlotte Bonaparte preyed upon his mind and he committed suicide in Venice. In his pictures the life of the Italian common people is delicately idealized, and among his contemporaries his works were greeted as they appeared with the greatest enthusiasm.

Robert of Gloucester, English historian. He was a monk in the abbey of Gloucester in the latter half of the 13th century, but of his life there nothing is known. His history of England extends from the fabulous Brutus to about 1300 A.D. The work is written in Anglo-Saxon, showing the transition stage of the language previous to Chaucer, and its chief value is linguistic. It is in verse, and contains upward of 10,000 lines and is filled with the most absurd fables. Numerous manuscripts prove its popularity. These are found in the Bodleian, Cottonian, Herald's College, and other libraries. Thomas Hearne printed it at Oxford in 1724, but the best edition is that of Aldis Wright in the Rolls series (two vols. 1887). It is partly based on earlier works, is wholly destitute of originality and some have thought it a translation from the French.

Robert of Molesme, mō-lām, Saint, founder of the Cistercians: b. Champagne 1018; d. Molesme 1110. At 15 he became a Benedictine monk in the abbey of Montier-la-Celle, where on account of his high and religious character he was elected prior while still the youngest member of the community. He was afterward appointed abbot of Saint Michael de Tonnerre. He was induced to leave this abbey through the recalcitrancy of the monks. In Colan, however, a desert place near the abbey, there lived certain anchorites, and at their request he became their superior; they thence removed to the forest of Molesme, where they built themselves cells and an oratory dedicated to the Holy Trinity (1075). Here the community became relaxed in discipline through the bounteous contributions provided by the bishop of Troyes and others. Robert therefore left them and eventually settled with some devout members of the abandoned community at a place called Cistercium, or Cîteaux, five leagues from Dijon in the diocese of Chalons. They chose a spot in the uninhabited forest with the consent of Walter, bishop of Chalons, and Renand, viscount of Beaune, lords of the territory. The day of their establishment was Saint Bennet's Day, 21 March 1098, from which must be dated the foundation of the Cistercian Order. The rule established by Saint Robert allotted four hours for sleep, four for singing the offices, four for manual labor and four for study. Thus was the great, practical, and highly useful Cistercian Order founded; and it was presided over by Abbot Robert until his death.

ROBERT COLLEGE — ROBERTS

Robert College, Constantinople, Turkey, so called after Christopher R. Robert of New York, its chief benefactor, was organized by James H. and William B. Dwight, sons of the Rev. Harrison G. O. Dwight, an American missionary to Turkey. It was opened in 1863, its financial support being guaranteed by the philanthropy of Mr. Robert who died in 1878, and whose total contributions to the institution amounted to \$450,000. In 1864 the college was affiliated to the University of New York. Its first president was the Rev. Cyrus Hamlin, D.D., who at his resignation in 1877 was succeeded by the Rev. George Washburn, D.D. The curriculum is similar to that of the average American college; while English is the principal language in use, instruction is also given in 13 other languages. The first home of the college was in a private house; the two college buildings built in 1871 and 1891 respectively occupy a fine site on the Bosphorus.

Robert Elmore, a novel by Mrs. Humphry Ward, published in 1885. It is a brilliant example of the embodiment in a work of fiction of intellectual problems of contemporary interest and recounts the struggles of an Anglican clergyman who cannot accept all the miracles and dogmas of Christianity, while in deep sympathy with its spirit. The work had a phenomenal success, partly owing to the nature of its subject, and partly to its genuine literary merit. Aside from its intrinsic value, the sensation it produced entitles it to rank as one of the most remarkable books of its generation.

Robert-Fleury, rō-bār flē-rī, **Joseph Nicolas**, French painter: b. Cologne 8 Aug. 1797; d. Paris 5 May 1890. In early life he studied under Gros at Paris, and after visiting the galleries and studios of Italy finally settled in the French capital. His works are distinguished for impressive characterization and profound sentiment; and among them may be mentioned: 'Night of Saint Bartholomew's' (1833); 'Religious Conference at Poissy in 1561' (1840); 'Jane Shore after her Condemnation Insulted by the People' (1850); 'Sack of a Jew's House at Venice in the Middle Ages' (1855); the last three are in the Luxembourg Museum. He also decorated with paintings the hall of the Chamber of Commerce at Paris.

Robert-Fleury, Tony, French painter: b. Paris 1 Sept. 1837. He was a pupil of Delaroche and Cogniet and is known for his historical and genre pictures, as well as for portraits. Among his best works are: 'Warsaw on 6 April 1861'; 'Scene During the Polish Insurrection'; 'The Old Women of the Piazzo Ravona, Rome' (1867, in the Luxembourg); 'The Daughters of Danaus' (1873); 'Charlotte Corday at Caen in 1793' (1874); 'The Sack of Corinth' (1870, in the Luxembourg); and a ceiling picture in the Luxembourg 'The Apotheosis of French Sculpture.'

Robertson, E. H., English mining engineer: b. West Riding, Yorkshire, 1877. He was graduated from Christ Church, Oxford, in 1899, studied engineering at Rutherford College, Newcastle-on-Tyne, and in 1892 became demonstrator of mining at the University of Birmingham. He has also assisted in the studies and investigations connected with the Royal Coal Commission.

Roberts, Benjamin Stone, American soldier: b. Manchester, Vt., 1811; d. Washington, D. C., 29 Jan. 1875. He was graduated from West Point in 1835, and in 1839 became chief engineer in the construction of the Champlain and Ogdensburg railroad. He was assistant geologist of New York State in 1841, and in 1843 was admitted to the bar and engaged in law practice. At the outbreak of the Mexican War he re-entered the army with rank as lieutenant. He served at Vera Cruz, Cerro Gordo, Contreras, Churubusco, Matamoras and the Galajara pass, was promoted captain, received brevet rank of lieutenant-colonel, and at the close of the war was voted a sword of honor by the Iowa legislature. In 1861 he was commissioned brigadier-general of volunteers and served under General Pope as chief of cavalry in the Army of Virginia. He was present at Cedar Mountain and the second battle of Bull Run and at the close of the war was brevetted brigadier-general in the regular army. In 1866 he became lieutenant-colonel of cavalry and in 1868 accepted the chair of military science at Yale which he occupied until his retirement in 1870. He was the inventor of the Roberts breech-loading rifle.

Roberts, Benjamin Titus, American Methodist clergyman: b. Leon, Cattaraugus County, N. Y., 1823; d. Chili, N. Y., 27 Feb. 1893. He was graduated at Wesleyan University in 1848, joined the Genesee Conference of the Methodist Episcopal Church, but in 1860 was one of the seceders from that body who founded the Free Methodist sect, of which he became the first general superintendent. In the same year he began a monthly magazine called 'The Earnest Christian' and in 1865 founded the Cheeseborough Academy at North Chili, N. Y., serving as its president from 1869 until his death. He wrote: 'Fishers of Men'; 'Why Another Sect'; 'First Lesson in Money'; 'Ordaining Women.'

Roberts, Brigham Henry, American journalist and politician: b. Warrington, Lancashire, England, 13 March 1857. In the summer of 1866 he emigrated with his parents to Davis County, Utah. In 1878 he was graduated from the University of Utah, and soon afterward was called by the Mormon Church to its missionary service. After laboring for some years as a missionary he was elected to a high office in the church. He also engaged in journalism and was editor-in-chief of the Salt Lake Herald. In 1895 he was a member of the State Constitutional Convention. At the first State election he was the Democratic nominee for Representative to Congress, but was defeated. In 1898, however, he was elected by a large majority. His election created widespread agitation throughout the country, and on 25 Jan. 1900 the House of Representatives by an overwhelming majority voted to exclude him as constitutionally ineligible, as a polygamist, to a seat in that body. He is the author of 'The Gospel' (1888); 'Life of John Taylor' (1892); 'Outlines of Ecclesiastical History' (1893); 'Succession in the Presidency of the Church' (1893); 'A New Witness for God' (1895); 'Missouri Persecutions' (1900); 'The Rise and Fall of Nauvoo' (1900).

Roberts, Charles George Douglas, Canadian author: b. Douglas, near Fredericton, New

ROBERTS

Brunswick, 10 Jan. 1860. He was educated at the University of New Brunswick, in 1883-4 was editor of the *Toronto 'Week'*; in 1885-7 was professor of English and French literature in King's College (Windsor, N. S.); and was professor of economics and international law from 1887 until his resignation in 1895, since when he has lived in New York. His reputation was first made as a poet with a gift of melody, a clear and grave manner, and a particular felicity, noticeable in the Canadian school, in pictures of nature. Later, he became equally known for his prose-work in 'The Heart of the Ancient Wood' (1900), and 'The Kindred of the Wild' (1902), the latter one of the most successful of imaginative treatments of wilderness life. The collection of short stories, 'Earth's Enigmas' (1896), also is marked by an interesting individual quality. Among Roberts' other volumes are: 'In Divers Tones' (1887); 'Ave: An Ode for the Shelley Centenary' (1892); 'Songs of the Common Day' (1893); 'The Raid from Beauséjour' (1894); 'A History of Canada' (1897); 'The Book of the Native' (1897); 'The Forge in the Forest' (1897); 'By the Marshes of Minas' (1900); 'The Book of the Rose' (1903).

Roberts, David, English painter: b. Edinburgh 24 Oct. 1796; d. London 25 Nov. 1864. In 1818 from being a house painter he advanced to the profession of scene painter, and in 1821 painted scenery for the stage of Drury Lane, London. All this while he was studying drawing and oil painting, and in 1826 and 1827 he attracted attention by his pictures of Rouen and Amiens cathedrals. Later on he traveled in Spain, Morocco, Egypt, Palestine, Italy, Belgium, making drawings of great buildings and landscapes with picturesque edifices, and working them up into pictures. Among his works the following are the most noteworthy: the drawings from Spain for the 'Landscape Annual' (1835-8); and illustrations for the volume entitled 'The Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia' (1842). His other pictures represent numerous interiors of churches; as St. Miguel at Xeres, Holy Nativity at Bethlehem, St. Jean at Caen, St. Paul at Antwerp, St. Peter's at Rome, the cathedrals of Milan and Seville. Among his religious historic pictures are 'Departure of the Israelites from Egypt' (1829); 'Ruins of the Great Temple at Karnac' (1845); 'Destruction of Jerusalem' (1849), which were followed by 'Rome' (1855); and 'Grand Canal at Venice' (1856). Roberts' style was essentially spectacular; he produced grand, broad effects, with magnificent architectural arrangements, to which the details are of course generally sacrificed.

Roberts, Ellis Henry, American financier: b. Utica, N. Y., 30 Sept. 1827. He was graduated from Yale in 1850 and in the following year became editor and proprietor of the *Utica Morning Herald*. He sat in the State legislature in 1867, was a member of Congress 1871-5, afterward continuing his editorial work until 1889, when he was appointed assistant treasurer of the United States. In 1893-7 he was president of the Franklin National Bank in New York, and since 1897 has been United States treasurer. He has published: 'Government Revenues' (1884); 'The Planting and Growth of the Empire State' (1887).

Roberts, Sir Frederick Sleigh Roberts, 1st EARL, English military officer, son of General Sir Abraham Roberts: b. Cawnpore, India, 30 Sept. 1830. He was taken to England at two and was educated at Clifton, Eton, the Royal Military College at Sandhurst, and at the East India Company's cadet college at Addiscombe. In December 1851 he was appointed 2d lieutenant in the Bengal artillery and in the following April sailed to join his company at Dum-Dum. A few months subsequently he became aide-de-camp to his father, then in command of the Peshawur division, and in November 1854 was posted to a troop of horse artillery on the north-western frontier. His ability secured for him a staff appointment as deputy assistant quartermaster-general and when the Punjab movable column was formed to quell the mutiny, young Roberts was chosen by Neville Chamberlain as his staff-officer, a position he likewise held under Chamberlain's successor, Nicholson. His first experience of actual warfare was at the siege of Delhi, where he was wounded, and in June 1857 he was promoted lieutenant. In September he left Delhi in command of a force bound for Cawnpore, and in the subsequent operations for the relief of Lucknow took an active share. At Khundaganj he rescued at the risk of his life a comrade hard pressed by the enemy, and then captured a standard guarded by two sepoy, for which services he was awarded the Victoria Cross. He participated in the re-establishment of English authority at Fategharh and at Lucknow, and in 1858-60 was on leave of absence to England. He returned to India in the latter year with rank as captain and brevet major, and served again under Sir Neville Chamberlain in the Umbeyla campaign of 1863. In the Abyssinian campaign in 1868 he served as assistant quartermaster-general, held a command in the Lushai expedition of 1871-2 and in 1872-5 was deputy quartermaster-general. He was promoted major-general in 1878 and on the outbreak of the Afghan war was assigned to command the Kuram field force. On 21 November he advanced into Afghanistan though without communication with India and wholly dependent upon a hostile country for supplies. Nine days later he forced the Afghan position at Peiwar Kotul, but further operations were suspended by the treaty of Gandamak. The murder of the British ambassador, Sir Louis Cavagnari, at Kabul, resulted in renewal of the war in 1879, and in October General Roberts again moved against the Afghans. He utterly defeated the forces of Yákúb Khan at Kabul, forced his abdication, sent him a prisoner to India, and then occupied with the British forces the fortified cantonment of Sherpur. In 1880 intelligence of the siege of the British garrison at Kandahar by Ayub Khan reached General Roberts and on 9 August he set out to the relief of the garrison with an army of 10,000 picked men. For three weeks the army was lost from the view of the world, but on 31 August Roberts reached Kandahar, gave battle to Ayub Khan, routed his army, and captured his artillery and camp. After the withdrawal of troops was effected he visited England, where he was enthusiastically welcomed and showered with honors. He was created a baronet, presented with the freedom of cities, received the thanks of Parliament and a special

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medal was struck in honor of his march to Kandahar. In 1881 he was ordered to South Africa as governor of Natal and commander-in-chief against the Transvaal Boers, but peace was concluded before his arrival. He returned to India in November 1881, with rank as lieutenant-general in command of the Madras army, and in 1885 became commander-in-chief of India. In 1890 he received full rank as general and in 1892 was created a baron. He resigned his command in 1893 and returned to England, where he was appointed commander-in-chief of the forces in Ireland in 1895, sworn as a member of the privy council of Ireland, and later in the same year made field-marshal. After the disasters which had continuously beset the British arms in South Africa in 1899 at Stormberg, Magersfontein and Colenso, where Roberts' only son fell, the public turned their attention once more to the field-marshal and clamored for his appointment as commander. He arrived at Cape Town early in 1900 with Lord Kitchener as his chief of staff and at once proceeded to the relief of Kimberley. He captured General Cronje with a large share of his force at Paardeburg, then continued a steady fight until Ladysmith was relieved, and a forced march to Bloemfontein followed by the occupation of that post with British troops. Three months later came the second critical point in General Roberts' manipulation of the war. He made a rapid advance upon Johannesburg and Pretoria by way of Kroonstad and Vereeniging and though handicapped by short rations, opposed at almost every step of the way by the enemy, and with railway communication cut off, Roberts moved steadily upon the Boer capital, seized it, relieved Mafeking, annexed the two republics by proclamation, and in the latter part of 1900 declared the war ended. He then resigned his command and returned home. Parliament voted him its thanks and a gift of £100,000, he was advanced to the peerage as Earl Roberts of Kandahar, Pretoria, and Waterford, and Viscount Saint Pierre, and made commander-in-chief of the United Kingdom. In 1901 he became a member of the privy council. His only son having been killed at Colenso, the peerage will by special grant descend to his daughter. Lord Roberts is to the British army the ideal of a soldier, and by the rank and file is affectionately termed "Bobs." Added to his military skill is an inexhaustible capacity for detail, a quick grasp of possible alternatives, a tireless energy, and the power to command men and to infuse them with his own indomitable courage and determination. He has written: 'The Rise of Napoleon' (1895); and 'Forty-one Years in India' (1897).

HARRIET BRUNKHURST,
Editorial Staff, 'Encyclopedia Americana.'

Roberts, Howard, American sculptor: b. Philadelphia 1843; d. Paris 19 April 1900. He studied at the Pennsylvania Academy of Fine Arts, and in 1866 went to Paris and studied under Dumont and Gumery at the Ecole des Beaux Arts. In 1875 he established a studio in Philadelphia and at the Centennial Exhibition exhibited a statue, 'La Première Pose,' that created a sensation on account of its superior technical qualities. He received one of the three medals awarded to American sculptors.

Other works are 'Eleanor'; 'Hester Prynne'; 'Hypatia'; 'Lot's Wife,' nearly all being at the Pennsylvania Academy.

Roberts, John Bingham, American surgeon: b. 29 Feb. 1852. He was graduated at the University of Pennsylvania in 1871, and at the Jefferson Medical College in 1874. He is president of the Philadelphia County Medical Society, Medical Society of the State of Pennsylvania, and vice-president of the American Surgical Society. He is a contributor to medical and scientific papers and has published 'Paracentesis of Pericardium' (1880); 'Surgery of Human Brain' (1885); 'Fractures of Radius' (1897); 'Deformities of the Face' (1900); etc.

Roberts, Margaret, British novelist: b. Honyngs, North Wales, 1833. She has lived much on the Continent and wrote her first book in Italian. Her books, which have been published, for the most part, anonymously, include: 'Atelier d'Lys'; 'Mademoiselle Mori' (1860); 'Denise' (1863); 'Madame Fontenoy' (1864); 'On the Edge of the Storm' (1868); 'In the Olden Time' (1883); 'Under a Cloud' (1888); etc.; several of these have been much read in this country.

Roberts, Morley, English novelist and journalist: b. London 29 Dec. 1857. After study at Owens College, Manchester, he went, in 1874, to Australia, and there worked on railways in Victoria and as a sheep and cattle rancher in the New South Wales bush. Then he was before the mast in merchant ships, and after some experience in the quartermaster general's department of the British war office and in the India office, set out again traveling, visiting in 1884-6 many of the western United States, Canada, British Columbia, and Manitoba, and later the South Seas. His hardships and adventures have lent a certain element of vigor to his stories, which are better known in England than in the United States, and include: 'King Billy of Ballarat' (1891); 'The Reputation of George Saxon' (1892); 'Red Earth' (1894); 'The Degradation of Geoffrey Alwith' (1895); 'The Great Jester' (1896); 'The Circassian' (1896; with Max Montesole), an interesting book of Eastern life; 'The Keeper of the Waters' (1898); 'The Colossus' (1899), which, as giving a portrait of Cecil Rhodes (q.v.), was perhaps most talked of among Roberts' works; 'Immortal Youth' (1902); 'The Way of a Man' (1902), etc.

Roberts, Robert Richford, American Methodist bishop: b. Frederick County, Md., 2 Aug. 1778; d. Lawrence County, Ind., 26 March 1843. He removed with his family in 1785 to Ligonier Valley, Western Pennsylvania, and was brought up on the frontier. He obtained Methodist books, studied for the ministry, in 1802 was licensed to preach, served as an itinerant preacher for several years, and later was in charge of important pastorates in Baltimore and other cities. In 1816 he was elected bishop and soon after removed to Indiana. He did much for Indian missions and among the Indians he was known as "the grandfather of all the missionaries." Consult: Charles Eliot, 'Life of Bishop Roberts' (1853).

Roberts, William Charles, American Presbyterian clergyman: b. Aberystwyth, Wales, 23 Sept. 1832. He was graduated from Princeton

University in 1855 and from Princeton Theological Seminary in 1858. He was pastor of the First Presbyterian Church, Wilmington, Del., 1858-62, the First Presbyterian Church, Columbus, Ohio, 1862-4, and the Second Presbyterian and Westminster churches, Elizabeth, N. J., 1864-82. He was president of Lake Forest, Ill., University, 1886-92, and was moderator of the General Assembly of the Presbyterian Church 1889. He has published 'The Great Preachers of Wales' (1865); translation of 'Shorter Catechism into Welsh' (1867); 'New Testament Conversions' (1895).

Roberts, William Milnor, American civil engineer; b. Philadelphia 12 Feb. 1810; d. Brazil, South America, 14 July 1881. As early as 1831 he was senior principal assistant engineer on the Allegheny Portage railroad, and in 1835 he planned and built across the Susquehanna River at Harrisburg the first combined railroad and highway bridge in this country. During the next 20 years he was engineer or contractor on many American railroads and canals. In 1857 he went to Brazil and undertook the construction of the Dom Pedro II. railroad. During 1866-8 he was U. S. civil engineer in charge of improvements of the Ohio River; from 1868-70 associate contractor with James B. Eads in building the bridge across the Missouri at Saint Louis. In 1870 he became chief engineer of the Northern Pacific railroad, and in 1874 visited Europe on an observation tour of jetties as member of the commission of civil and military engineers to report on plans for the improvement of the mouth of the Mississippi River. In 1879 the emperor of Brazil appointed him on a commission of hydraulic engineers to report on harbors and rivers of Brazil, and in prosecution of these labors he died of a fever. He was president of the American Society of Civil Engineers in 1879.

Roberts-Austen, William Chandler, English metallurgist; b. 1843; d. 22 Nov. 1902. He was graduated at the Royal School of Mines, London, and became an assistant in the mint. In 1869 he was made assayer to the mint, and in 1882 was appointed queen's assay master. He had already, in 1880, been appointed professor of metallurgy at the Royal School of Mines, and held the two positions at the time of his death. He assumed the name of Austen in 1885. He was one of the founders of the Physical Society of London, of which he became vice-president; a member of the British executive council of the Paris Exposition of 1889; vice-president of the International Mining and Metallurgical Congress at Paris. He contributed papers mainly relating to metals to the 'Philosophical Transactions.'

Robertson, rōb'ert-sōn, Frederick William, English clergyman; b. London 3 Feb. 1816; d. Brighton 15 Aug. 1853. He was ordained in 1840; was graduated from Brasenose College, Oxford, in 1841; in that year he was made curate of Christ Church, Cheltenham; and from 1847 until his death was pastor of Trinity Chapel, Brighton. His eloquence was remarkable, and soon extended his renown far beyond local limits. He was an eclectic in theology, and declared for no party in a time when the clergy were generally partisans. His frequent dissent from various positions of the schools of thought, brought upon him numerous attacks, whose importance he was wont to overestimate. His views were colored by study of the Germans, and developed

considerably during the progress of his ministry. His mind was positive, original, and without fear; and his constant labor greatly affected his health. He was deeply interested in the workingmen's institute, which he founded at Brighton, and whose work he made very effective. His 'Sermons' (1855-90), though derived from inadequate shorthand notes or from recollections prepared by himself, have been very widely read. His other important work has been collected in his 'Literary Remains.' Consult the 'Life and Letters' by S. A. Brooke (1865).

Robertson, Harrison, American journalist and author. He is associate editor of the Louisville *Courier-Journal*, Kentucky, and has written: 'How the Derby Was Won' (1889); 'If I Were a Man' (1899); 'Red Blood and Blue' (1900); 'The Opponents' (1902); etc.

Robertson, James, English royal governor of New York; b. Fifeshire, Scotland, about 1720; d. London, England, 4 March 1788. He entered the army and after various services sailed for America in 1756, was appointed major-general of the royal troops raised in America and barrack-master at New York. He commanded a brigade at the battle of Long Island in 1776 and after André's capture made an earnest effort to secure his release. In 1779 he was appointed royal governor of New York, and in 1782 received rank as lieutenant-general. He returned to England in the following year. His reputation was that of an avaricious and supercilious officer and in his position as governor he was charged with arbitrary measures.

Robertson, James, American pioneer; b. Brunswick County, Va., 28 June 1742; d. Chickasaw region, Tenn., 1 Sept. 1814. In 1769 he accompanied Daniel Boone (q.v.) on the latter's third exploration, and stopping at Watauga (now Elizabethton, Tenn.), planted corn. In 1770 he returned thither with a band of North Carolinian settlers. The settlement soon numbered some 200. Both North Carolina and Virginia asserted jurisdiction over it, but neither colony offered protection; and it was left an independent outpost of civilization. With John Sevier, Robertson became the head of the communities which gathered about the Holston and Watauga. In 1777 he was commissioned agent of North Carolina among the Cherokees, and during his residence of more than a year thwarted the British agent and kept at peace the great body of Cherokees and Creeks. With a party of settlers he set out in 1779 for the French Lick of the Cumberland, and on 25 December made the beginnings of a town on the site of Nashville, then 15 days' journey from the westernmost white confines. A fort built, a military organization was made, with Robertson as colonel. Troubles increased. Provisions were low, and the Indians hostile. He detached the Chickasaws and Choc-taws from their English alliance and concluded a treaty with the Cherokees. He also defended the settlement against the Creeks, who were abetted by the Spanish authorities of Louisiana; and refused to organize a separate state in alliance with Spain. In 1790 Robertson was commissioned United States brigadier-general, and latterly he was government Indian agent. He was well fitted for his frontier career, and especially successful in his dealings with the savages. His favorite saying, "Man proposes, but God dis-

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poses," he always insisted was somewhere in the Book of Job. Consult the 'Life' by Putnam (1859); Gilmore, 'The Rear Guard of the Revolution' (1886); and 'Harper's Magazine,' February 1888, pp. 420-6.

Robertson, James Burton, English historian: b. London 15 Nov. 1800; d. Dublin 14 Feb. 1877. He was educated at the Roman Catholic College of St. Edmund, near Ware, and was called to the bar in 1825. Later he studied literature, philosophy, and dogmatic theology in France. His first important publication was a translation of Frederick Schlegel's 'Philosophy of History' (1835). He lived in Germany in 1851-4, and here produced a translation of Möhler's 'Symbolism or Exposition of Doctrinal Differences Between Catholics and Protestants' (1843), a work which made a deep impression on the Tractarians. In 1855 J. H. Newman, then rector of the Catholic University at Dublin, called him to the chair of geography and modern history and later the department of English literature was assigned him. His original works comprise lectures 'On Subjects of Ancient and Modern History' (1859); 'On Subjects of Modern History and Biography' (1864); on the 'Writings of Chateaubriand, and on the Illuminati, Jacobins, and Socialists'; 'On the Life, Writings and Times of Edmund Burke' (1869), together with poetry and translations.

Robertson, James Craigie, Scottish clergyman: b. Aberdeen, Scotland, 1813; d. Canterbury, England, 9 July 1882. He was graduated from Cambridge in 1834, and took orders in the Anglican Church, in 1836. He was made canon of Canterbury in 1859, and from 1867-74 was professor of ecclesiastical history at King's College, London. He published: 'How Shall We Conform to the Liturgy' (1843); 'Church History' (1852-73); 'Plain Lectures on the Growth of Papal Power' (1876); edited Heylyn's 'History of the Reformation' (1849); 'Materials for the History of Archbishop Thomas Becket' (1875-82); etc.

Robertson, James Logie, Scottish educator and author: b. Milnathort, Kinross-shire, 18 Sept. 1846. He was educated at Edinburgh University, and has been first English master at Edinburgh Ladies' College from 1891. He has published several volumes of pleasing verse, 'Horace in Homespun' (1886); 'Ochil Idylls' (1896); 'Adaptations from Dunbar' (1895); etc., while among his prose works may be cited 'In Scottish Fields' (1890); 'A History of English Literature' (1894). He has also edited editions of Scott (1894) and Burns (1896); 'The Select Chaucer' (1902); etc.

Robertson, Morgan, American author: b. Oswego, N. Y., 30 Sept. 1861. He was educated in the public schools and at Cooper Institute; went to sea in 1877-86 and then engaged in business as a jeweler. He has published: 'A Tale of a Halo' (1894); 'Spun Yarn' (1898); 'Where Angels Fear to Tread' (1899); 'Shipmates' (1901); 'Down to Sea' (1903); 'Down to the Sea' (1905).

Robertson, Thomas William, English actor and dramatist: b. Newark on Trent, 9 Jan. 1829; d. London 3 Feb. 1871. He came of a theatrical family and played his first part at the age of four. He had a varied career as actor, newspaper writer, adapter of plays, as well as dramatist, in none more than successful enough

to gain a bare subsistence until he wrote 'David Garrick,' produced by E. A. Sothern in 1864. This piece has taken a permanent place on the English stage. Following this a play called 'Society' had a long and successful run, making the fortunes of the Prince of Wales Theatre and the author. At the same house were produced his most successful series of plays, including 'Ours,' 'Caste,' 'Play,' 'School,' and 'M. P.' Some of these, especially 'Caste,' his masterpiece, are revived from time to time. His comedy was artificial, with a strong sentimental interest; but he was a good observer of manners and drew his characters from the life. He established a distinct school, and has had several followers, though in the best exponents of the later English dramas he has been replaced by writers whose methods are less artificial and hence more logical. His 'Principal Dramatic Works' were published with a memoir by his son in 1889. Consult also Pemberton, 'Life and Writings of T. W. Robertson' (1893); Cook, 'Nights at the Play' (1883); Clement Scott, 'The Drama of Yesterday and To-day' (1899).

Robertson, William, Scottish historian: b. Borthwick, Midlothian, 19 Sept. 1721; d. near Edinburgh 11 June 1793. After the completion of his course in Edinburgh University, Robertson obtained a license to preach in 1741, and in 1743 was presented to the living of Gladsmuir, in East Lothian. His 'History of Scotland During the Reigns of Queen Mary and King James VI.' appeared in 1759, and was received with general applause, though modern research has deprived it of most of its historical value. This work, which reached a 14th edition before the author's death, led to his nomination to the chaplaincy of Stirling Castle in 1759, as one of the king's chaplains in 1761, and as principal of the University of Edinburgh in 1762. The year after he was made historiographer-royal of Scotland, with a salary of £200 per annum. His 'History of the Reign of Charles V.' appeared in 1769, and his 'History of America' in 1777. His latest work appeared in 1791, under the title of a 'Historical Disquisition Concerning the Knowledge which the Ancients Had of India, and the Progress of Trade with that Country Prior to the Discovery of the Cape of Good Hope.' Consult: 'An Account of the Life and Writings of William Robertson' (1801-2); Gleig, 'Life and Writings of William Robertson' (1812); Graham, 'Scottish Men of Letters in the 18th Century' (1901).

Robeson, rōb'son, George Maxwell, American politician: b. Oxford, Warren County, N. J., 1829; d. Trenton, N. J., 27 Sept. 1897. He was graduated at Princeton University in 1847, and three years later was admitted to the bar. In 1867 he was appointed attorney-general of New Jersey, and during the two administrations of President Grant (1869-77) was secretary of the navy. He was a successful candidate for Congress in 1878 and 1880, and on retiring from Congress in 1883 resumed his law practice in Trenton, N. J.

Robeson, Henry Bellows, American naval officer: b. New Haven, Conn., 5 Aug. 1842. He was graduated from the United States Naval Academy in 1860, entered the navy as midshipman, and in 1862 was promoted lieutenant. He was engaged in the attack on Charleston, S. C., 7 April 1863, and later in the same year led a

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party from the New Ironsides in the capture of the Confederate works at Morris Island. He participated in both attacks on Fort Fisher, was advanced to be lieutenant-commander in 1866 and commander in 1874. He was made commodore in 1898 and in 1899 was retired with rank as rear-admiral.

Robespierre, rō-bēs-pē-ār or rō'bēs-pēr, **Maximilien Isidore François Marie**, French revolutionist: b. Arras 6 May 1758; d. Paris 28 July 1794. He was the son of an avocat and having been left an orphan at 11 was sent by his grandfather to the college of his native town, from which he passed in 1770 to the Collège Louis-le-Grand at Paris on a scholarship given him by the Bishop of Artois. After pursuing the study of law with great distinction, he returned, in 1781, to Arras, where he adopted the profession of avocat. Solid, rather than brilliant, he quickly became known as a skilful lawyer and a man of unimpeachable integrity. With growing success he gave much of his time to the dilettante pursuit of literature, wrote essays in competition for prizes offered by the provincial academies and was a prominent member of the Rosati, a society devoted to the cultivation of wit and letters. He was an ardent student of Rousseau and a fanatical believer in the teachings of the Genevan philosopher; indeed Robespierre's unwavering convictions in the possibility of realizing Rousseau's ideal society explains his course in the days when he stood forth as the greatest figure in France, and gives the secret of his temporary success. In the events leading up to the election of the States-General Robespierre appeared prominently as the champion of the liberal views then so widespread among the French bourgeoisie. He was elected fifth deputy to the States-General from Artois, and allied himself with the radical faction in that body. In the constituent assembly he spoke frequently and always in the spirit of that equality which he believed was now at length to be established in France. Of small stature and by no means robust health, weak-voiced and pale-eyed, he did not impress himself on the mass of the assembly, but those who came into personal contact with him were gained over by his tremendous sincerity, and Mirabeau said of him: "That young man believes what he says; he will go far." Robespierre's great strength, however, was in the club of the Jacobins, where his polished, classical declamations gained him the ardent support of those members who had been recruited from among the working classes and the small bourgeoisie of Paris. His power in the club became absolute when the more conservative members seceded in 1791, after the more radical faction, under the inspiration of Robespierre, had prepared the petition for the deposition of Louis XVI., which led to the massacres in the Champ de Mars on 17 July. His popularity was demonstrated on the day of the dissolution of the National Assembly, 30 Sept. 1791, when Robespierre and Pétion were drawn in triumph through the streets of Paris, and crowned as "incorruptible patriots" by the people. In accordance with his own motion, adopted in May 1791, prohibiting members of the constituent assembly from sitting in the succeeding legislature, Robespierre took no direct part in the sessions of that body, but he continued to wield great

influence over its deliberations through his power in the Jacobine. In February 1792, he became public prosecutor at Paris, but resigned the office in April on account of the virulent attacks of the Girondists, who regarded him with special hatred because of his opposition to their favorite policy of war against Austria. Robespierre's opposition to the war was based on humanitarian grounds; he was, besides, a man of theories and not of action, and this would explain the little share he took in the uprisings of 20 June and 10 August, which, under the guidance of Danton, effected what Robespierre was quite pleased to see consummated, the overthrow of the Bourbon monarchy. Shortly after the storming of the Tuileries, Robespierre became a member of the Paris Commune; his personal popularity lent strength to that body, but his inability to prevent the prison massacres of September showed that his power was by no means absolute in the ranks of the radical party.

In the Convention to which he was elected as the first deputy from Paris, Robespierre became the leader of the Mountain. The Girondists turned the full force of their eloquence against him, and accused him of aiming at the dictatorship. In the crisis which attended the trial of Louis XVI., Robespierre for once assumed a firm and definite line of action. He pleaded for the death of the king and by so doing gained over to his side the party of Danton, Carnot and Bellaud-Varenne, who were disgusted by the temporizing policy of the Girondists at a time when France was in imminent danger of foreign invasion and needed a strong government to make headway against her enemies. The condemnation of Louis XVI. was a triumph for Robespierre, who, however, did not cease from his attacks on the Girondists. The struggle became one of life and death. In April, Robespierre denounced them in the body of the Convention, and on the fateful days of 31 May and 2 June the destruction of the party was accomplished with the aid of the Parisian mob. (See GIRONDIST.)

In July 1793, Robespierre was made a member of the Committee of Public Safety, which for a year was to be the virtual ruler of France. To curb dissension at home, so as to present a united front to the foreign foes of the country, the committee organized the Terror with which the name of Robespierre has become, through legend, synonymous. To the world at large Robespierre appeared as the master of the committee and the ruler of France. As a matter of fact, his power was in no way absolute. Of the 12 members of the committee, the majority were quite opposed to his Rousseauian ideals and only two of the 12, Couthon and St. Just, were professed followers of Robespierre. The rest of the committee were practical men of affairs, like Carnot, Bellaud-Varenne, or Collot d'Herbois, upon whose shoulders fell the real task of government. Robespierre's services to the committee were such as his immense popularity and spotless reputation could render it. He was the apologist for the committee in the Convention and before the people, but he differed from his associates entirely so far as the motives of his action are concerned. While the Terror to them was but a thorough, though possibly radical, means for establishing peace within the country, Robespierre saw in the Terror an effective

instrument for bringing about the erection of Rousseau's ideal state, by wiping out all opposed to his favorite theories. He first turned against Hébert (q.v.) and his followers in the Paris Commune, who had aroused his enmity by their uncompromising democracy, in their display of which they were guilty of the most ridiculous excesses, and their professed atheism, which attained its climax in the establishment of the worship of Reason by Chaumette (q.v.). The Hébertists were brought to the scaffold on 24 March 1794, and they were followed by Danton, Camille Desmoulins and their followers on 5 April. On 13 April came the turn of Chaumette. Danton fell because he had begun to advocate a moderation of the Terror and thereby had incurred the enmity both of the men of action on the Committee of Safety and of Robespierre, to whom alike the continuance of the Terror seemed essential. To hasten the work Robespierre caused the infamous law of the 22 Prairial (10 June) to be proposed by Couthon, whereby the revolutionary tribunal was freed from all restrictions of legal procedure, and thus improved sent nearly 1,300 persons to the scaffold between 12 June and 28 July.

On 8 June Robespierre attained the zenith of his career, when, as president of the Convention, he celebrated with great pomp the Feast of the Supreme Being, whose existence had been formally admitted by the Convention in the preceding month. His fall followed speedily. The men on the Committee of Safety who had suffered his official leadership as long as he was content to remain largely a figure-head, turned upon him when he began seriously to assert mastery over the committee. Besides, it became apparent that the excesses of the Terror could not go on, and that reparation would be demanded, and Robespierre was chosen as the scapegoat of the committee. The attack on Robespierre began 17 June, when Vadier, a member of the committee of general security, satirized him before the Convention. Instead of joining battle, as he was urged to do, Robespierre went into retirement for more than a month to prepare his defense. On 26 July he appeared in the Convention and declared that the Terror should cease, and that the committees of public safety and general security should be reorganized. Ominous threats appeared in his oration, which for a time held the Convention terror-stricken, and caused it to vote his proposition. Quickly, however, he was assailed by various orators, the Convention reconsidered its action, and in the session of the following day, the 27 July, the fateful 9th Thermidor, the secret intrigues of his associates on the committee, the fear of his intended victims and the resentment of the Dantonists, who had not forgotten the death of their leader, fell upon Robespierre. His arrest was ordered and with him that of St. Just, Couthon, Lebas, and his younger brother, Augustin Robespierre. Rescued by the national guards under Henriot, and brought to the Hôtel de Ville, the great Terrorist showed no capacity for action. The Convention placed him outside of the law, and despatched a portion of the national guard under Barras against him. In the assault Robespierre was shot in the jaw by a gendarme and taken in a pitiful condition to prison. On the following day he was brought before the revolutionary tribunal and with Couthon and St. Just and

others of his followers was sent to the guillotine. Consult: Aulard, 'La Société des Jacobins' (1891); Hamel, 'Vie de Robespierre' (1865-7), the principal authority; Belloc, 'Robespierre' (1902); Morse-Stephens, 'Principal Speeches of the Orators and Statesmen of the French Revolution' (1892).

Robin, a name originally applied in England to the red-breast (q.v.), a bird so familiar and so dear to the English heart that loyal colonists in many parts of the world have felt impelled to transfer the name to native species, which often resemble the original in little but the ruddy breast. The American robin is a true thrush (*Merula migratoria*) of the family *Turdidae*, and is found in summer throughout North America from Alaska to Virginia. Robins retire from higher latitudes only as their food begins to fail, or when driven south by inundating snows. During the winter months they are numerous in the Southern States, but even as far north as Boston robins are sometimes seen assembling round the open springs wherever berries may be found in the depth of winter. In the New England and the Middle States the robin is perhaps the most abundant breeding bird. Their nests of mud and grass are often seen on the horizontal branch of an apple tree, or in a shade tree, especially evergreens. The eggs, about four, are of a pale bluish-green, and without spots. They raise several broods in a season.

Robins feed upon insects, ripe cherries and other small fruits, but are especially fond of earthworms, which they extract from their burrows in the early morning and late afternoon with the greatest skill and industry, and of which they devour vast quantities. In spite of the fact that fruit growers consider them harmful, the cheery whistle and vivacious manners of the robin are rapidly gaining for it a place in popular esteem analogous to its English namesake. Unfortunately there are still parts of the country, and particularly of the South, where a sordid interest leads to the slaughter of great numbers of robins for the pot. In North Carolina they are killed at night in their roosting places. On the Pacific coast the robin varies to the sub-species *propinqua*, and in lower California a distinct species (*M. cinnus*) occurs. *Hesperocichla nevada* is sometimes called the Oregon robin.

Robin Adair, a-dâr, or **Eileen Aroon**, a familiar air, which, with the original words, was written, tradition says, by one Carroll O'Daly, an Irishman, of Elizabeth's time. However that may be, it was first popularized in England in the latter 18th century by Tenducci, an original singer in Dr. Arne's 'Artaxerxes.' Tenducci probably learned it in Ireland; at least it is known that he sang 'Eileen Aroon' with Irish words which had been phonetically arranged for him. The 'Robin Adair' form obtained currency through its rendering by Brahms at his benefit in London in 1811. Brahms's version was introduced by Boildieu into the latter's opera of 'La Dame Blanche.' Beethoven made a trio arrangement of it, with accompaniment by pianoforte, violin and cello.

Robin Goodfellow. See PUCK.

Robin Hood. See HOOD, ROBIN.

Robin Snipe, the red-breasted sandpiper or knot (*Tringa canutus*) in its summer plumage. This is among the largest of the sand-

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pipers, and is distinguishable by the long, perfectly straight beak combined with the absence of webbing from between the toes, the middle one of which is much shorter than the tarsus. It is upward of 10 inches long and stoutly built, with rather short stout legs. In breeding plumage the entire under parts are reddish brown, and the autumn young, which are abundant during the gunning season, have the breast and belly whitish tinged with red, and the back very characteristically marked with white and black semicircles. Such seasonal changes in coloration are unusual among the *Scolopacidae*. The knot is nearly cosmopolitan, breeding in high northern latitudes and wintering in the southern hemisphere. It passes through the United States in April and May, and again more leisurely in August to October, frequenting the seashore in small flocks, and, less commonly, the large rivers and lakes of the interior. Its habits are similar to those of the other sandpipers (q.v.), with which it associates. Because of its large size it is a favorite with gunners, among whom it is known in the autumn plumages as the gray-back.

Robins, rōb'inz, Benjamin, English mathematician: b. Bath 1707; d. Fort Saint David, Coromandel coast, India, 29 July 1751. He early became known as a mathematician of unusual ability, and in 1728 published a confutation of the veteran Johann Bernoulli (q.v.), who had attempted a defense of Leibnitz's theory as to the laws of motion relative to bodies impinging on one another. After some time spent as a private instructor in mathematics and physical science, he turned engineer, and made particular study of fortifications and gunnery. He published in 1742 his 'New Principles of Gunnery,' which he had undertaken by way of furthering his unsuccessful candidacy for the professorship of fortification at Woolwich. It was translated into German and French, and has been regarded as the starting point of the modern scientific study of the matter. Much of it was derived from personal experiment with gunpowder. In 1749 he was made engineer-general to repair the forts of the East India Company. He wrote several political pamphlets, which brought him into some notice. In 1761 'Mathematical Tracts,' containing the 'Principles of Gunnery,' appeared under the editorship of James Wilson. There were subsequent editions. Consult the memoir by Wilson in this collection.

Robins, Edward, American author: b. Pau, France, 2 March 1862. He was educated at a military academy in Philadelphia, and in 1883 engaged in newspaper work. He was on the editorial staff of the Philadelphia *Public Ledger* in 1884-8, 1895-7, and has since devoted himself to authorship. He has published, besides several juvenile works, 'Echoes of the Play House' (1895); 'Twelve Great Actors' (1900); 'Romances of Early America' (1902); etc.

Robins, Elizabeth. See PARKES, ELIZABETH ROBINS.

Robinson, rōb'in-sōn, Agnes Mary Frances. See DARMESTETER, AGNES MARY FRANCES ROBINSON.

Robinson, Albert Gardner, American journalist: b. Winchester, Mass., 21 Feb. 1855. He was engaged in commercial pursuits in 1871-98, but in 1898 became special war correspondent for the New York *Evening Post* in Cuba and Porto

Rico. He subsequently went to the Philippines and South Africa in the same capacity. He has published 'The Porto Rico of To-day' (1899); 'The Philippines—the War and the People' (1901); 'Historical Review of the Period of Intervention in Cuba'; etc.

Robinson, Beverley, American Loyalist soldier: b. Virginia 1723; d. Thornbury, England, 1792. He was a major under Wolfe at the taking of Quebec in 1759, and at the commencement of the Revolution was a large landed proprietor on the Hudson. He was opposed to the measures of the British ministry respecting the colonies, and abandoned the use of imported merchandise. Nevertheless, he remained loyal, and reluctantly entered the military service of the crown. The Loyal American regiment was recruited largely by him, and he was made its colonel. He was connected with the negotiations preliminary to Benedict Arnold's treason; and at the time Arnold was occupying as headquarters Robinson's country-seat. At the conclusion of the war he went to New Brunswick, where his name appears as a member of the first council, though he never took his seat; and thence to England. He lost his property by confiscation, and by way of compensation received £17,000 from the English government. Consult: Ryerson, 'The Loyalists of America and Their Times' (1880).

Robinson, Charles Mulford, American author: b. Ramapo, N. Y., 30 April 1869. He was graduated from the University of Rochester in 1891, was editor of the Rochester *Post-Express* in 1891-1902, and has published: 'The Improvement of Towns and Cities' (1901); 'Modern Civic Art' (1903); etc.

Robinson, Charles Seymour, American Presbyterian clergyman and hymnologist: b. Bennington, Vt., 31 March 1829; d. New York 1 Feb. 1899. He was graduated from Williams College in 1849, studied at Union Theological Seminary and at Princeton, and was ordained in the ministry in 1855. He held a pastorate in Troy 1855-60, and thereafter was pastor of various churches in New York with the exception of 1868-70, when he had charge of the American Chapel, Paris, France. He published several volumes of sermons and other works, and is widely known as a collector of hymns. His publications include: 'Songs of the Church' (1862); 'Church Work' (1873); 'The Pharaohs of the Bondage and the Exodus' (1887); 'New Laudes Domini' (1892); 'Annotations on Popular Hymns' (1893); 'Simon Peter: Later Life and Labors' (1894); etc.

Robinson, Edith, American novelist: b. Massachusetts 1858. Her literary work is partly of a juvenile character and includes: 'Forced Acquaintances' (1887); 'A Little Puritan Rebel' (1898); 'A Little Puritan Pioneer' (1901); 'A Puritan Knight Errant' (1902); etc.

Robinson, Edward, American Biblical scholar: b. Southington, Conn., 10 April 1794; d. New York 27 Jan. 1863. Graduated from Hamilton College in 1816, he went in 1821 to Andover to publish his edition of books, i.-ix., xviii., and xix. of the 'Iliad,' there aided Moses Stuart (q.v.) in the preparation of the second edition (1823) of the latter's 'Hebrew Grammar,' and rendered into English (1825) Wahl's 'Clavis

Philologica Novi Testamenti. After European study, largely in Halle and Berlin (1826-30), he was professor extraordinary of sacred literature in the Andover Theological Seminary in 1830-3, and professor of Biblical literature in Union Theological Seminary from 1837 until his death. In 1838 and 1852 he visited Palestine with the scholarly missionary, Eli Smith (q.v.), and there made careful surveys and investigations. His chief work, *'Biblical Researches'* (1841; 3 vols. compressed into 2, with a 3d 1856), which obtained for him the Royal Geographical Society's gold medal, was based on these studies. He was a leading member of the American ethnological, geographical and Oriental societies, and edited in 1831-4 the *'Biblical Repository'*, in 1843 the *'Bibliotheca Sacra'*, with which the *'Repository'* was incorporated, and for which he continued to write until 1855. Among his other publications are: *'A Dictionary of the Bible'* (1833); editions of Buttmann's *'Greek Grammar'* (1833; 3d ed. 1851) and Genselius' *'Hebrew Lexicon'* (1836; 5th ed. 1854); and Greek (1845; 2d ed. 1851) and English (1846) harmonies of the Gospels. Consult: Hitchcock, *'Life, Writings and Character of Edward Robinson'* (1863).

Robinson, Edward Arlington, American poet: b. Head Tide, Maine, 22 Dec. 1809. He was educated at Harvard and has published *'The Torrent and the Night Before'* (1896); *'The Children of the Night'* (1897); *'Captain Craig'* (1902), collections of verse which display much promise.

Robinson, Sir Frederick Phillips, English soldier: b. near New York Sept. 1763; d. Brighton, England, 1 Jan. 1852. He became ensign in 1777 in a Royalist American regiment, raised by his father, and fought in the battles of Horse-neck, Stony Point and New London. He returned to England in 1784; entered the West India service in 1793 and was present at the capture of Martinique, St. Lucia and Guadeloupe. He became colonel in 1810, and commanded a brigade in the Peninsula campaign of 1813, where he fought gallantly; was promoted major-general in 1814 and rewarded with a medal. He took part in the engagement before Plattsburg in 1814 during the war with the United States, and in 1816 left Canada for the West Indies, where he was put in command of the troops in the Windward and Leeward Islands and for a time was governor of Tobago. At the time of his death he was the soldier of longest service in the British army.

Robinson, Frederick William, English novelist: b. London 23 Dec. 1830; d. there 6 Dec. 1901. He was educated at Clarendon House, Kennington, and in 1851 began his career as a novelist, though he frequently contributed special articles to periodicals and for five years wrote dramatic criticisms for the *Daily News*. He founded and edited *'Home Chimes'*, which ran as a weekly two years and then became a monthly. He was a prolific writer and over 50 titles of novels stand to his credit. Some of them are as follows: *'The House of Elmore'* (1855); *'One and Twenty'* (1858); *'No Church'* (1861); *'Female Life in Prison'* (1862); *'A Woman's Ransom'* (1864); *'Beyond the Church'* (1866); *'Stern Necessity'* (1870); *'Her Face Was Her Fortune'* (1873); *'Second Cousin Sarah'* (1874); *'The Romance*

of a Back Street' (1878); *'Lazarus in London'* (1885); *'The Keeper of the Keys'* (1890); *'The Secretary'* (1895); *'Sweet Nineteen'* (1896). His skilfully constructed and fluently told fictions were as popular in this country as in his own.

Robinson, Henry Crabb, English barrister and diarist: b. Bury St. Edmunds 3 May 1775; d. London 5 Feb. 1867. In 1796 he entered a solicitor's office in London, and in 1800 went to Germany, where he spent five years in studying at Jena and elsewhere, and in making the acquaintance of Goethe, Schiller, Wieland, Herder, Kotzebue, and other noted Germans. In 1807 he went to Altona as *Times* correspondent, and in 1808-9 was war correspondent in Spain for the same newspaper. He was called to the bar in 1813, and practised until 1828. He was associated with the foundation of the University of London in 1828. His fame as a conversationalist approached that of Rogers, but he never made any serious attempt to gain distinction as a writer. His intimate acquaintance with many of the greatest men and women of his time, both in his own country and on the Continent, gives peculiar interest and value to the selections from his *'Diary, Reminiscences, and Correspondence'*, edited by Sadler in 1869.

Robinson, John, English Independent clergyman: b. Lincolnshire about 1576; d. Leyden, Holland, 1 March 1625. It has been widely assumed that he was educated at Corpus Christi College, Cambridge. He was, say certain later writers, suspended from a benefice in Norfolk. He himself mentions a residence in Norwich, where he was religious director of a band of worshippers, and where certain persons were excommunicated for their interest in his instruction. In 1608 he emigrated to Amsterdam, with several of the congregation of the church at Scrooby Manor, Nottinghamshire, and thence in 1609 to Leyden, where he was ordained pastor, with William Brewster (q.v.) as ruling elder. In 1611 a building was purchased for 8,000 guilders for use as a meeting-house. Mather in his *'Magnalia'* says that "those famous divines, Polyander and Festus Hommius, employed this our learned Robinson to dispute publicly in the University of Leyden against Episcopius, and the other champions of that grand choke-weed of true Christianity" (Arminian doctrine). There may be some foundation for the story of such a disputation; but it was probably not at Polyander's request, nor at the university, where Episcopius was in power. Robinson was admitted to the university in 1615, and attended Episcopius' lectures. He took a very active interest in the project for emigration to America; and had a majority of his church volunteered, would have accompanied them hither. Previous to the sailing of the *Speedwell*, he preached on 21 July 1620, observed as a day of prayer and humiliation. His celebrated address is given in Winslow's *'Hypocrisie Unmasked'* (1646), the author remarking that Robinson "used these expressions, or to the same purpose," and some allowance must be made for such improvements and embellishments as Winslow may have made to suit his controversial purpose. Robinson corresponded with the "church of God at Plymouth, New England." Mather calls him "a most wise, grave, good man," and Robert Baillie, "the most learned, polished, and modest spirit" among

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the separatists. His 'Works,' with memoir and notes of Robert Ashton, appeared in 1851. Consult also: Bradford, 'History of Plymouth Plantation' (Coll. of the Mass. Hist. Soc., 4th ser., Vol. III., 1856); Mather, 'Magnolia' (1702); Neal, 'History of New England' (1720); Brook, 'Lives of the Puritans' (1813); Dexter, 'Congregationalism of 300 Years' (1880); 'Life' by Davis (1903).

Robinson, John Cleveland, American soldier: b. Binghamton, N. Y., 10 April 1817; d. there 18 Feb. 1897. He entered West Point in 1835, but withdrew in 1838 to study law, accepting, however, a commission as 2d lieutenant in 1839. He was engaged in the Mexican and Seminole wars, was promoted captain in 1850 and at the outbreak of the Civil War was commissioned colonel of volunteers. He was in command of Fort McHenry at the opening of the war; successfully defended it, and was later engaged in organizing volunteer troops. He commanded a brigade in the Army of the Potomac in the Seven Days' battle before Richmond; was present at the battles of Fredericksburg, Chancellorsville, Gettysburg, Wilderness, and Spottsylvania, and in the last lost a leg and was prevented from further active service. He was voted a medal of honor by Congress; was brevetted major-general of volunteers in 1864, and of regulars in 1865. In 1866 he was mustered out of the volunteer service and accorded rank as colonel in the regular army. He was in command of the Department of the South in 1867, of the Lakes in 1868-9, and in the latter year was retired with rank of major-general. He was elected lieutenant-governor of New York in 1872, was commander-in-chief of the G. A. R. in 1877-8, and president of the Society of the Army of the Potomac in 1887-8.

Robinson, Joseph Armitage, English Anglican clergyman. He was educated at Cambridge, took priest's orders in the Established Church in 1832 and was vicar of All Saints, Cambridge, 1838-92. From 1893 to 1899 he was Norrisian professor of divinity at Cambridge, and was prebendary of Wells' Cathedral 1894-99. He was rector of St. Margaret's Westminster, 1899-1900, canon of Westminster 1899-1902, and in the year last named succeeded Dean Bradley as dean of Westminster Abbey. He has published 'A Collation of the Athos Codes of the Shepherd of Hermas' (1888); 'Appendix to the Apology of Aristides' (1891); 'The Passion of St. Perpetua' (1891); 'The Philocalia of Origen' (1893); 'Euthaliana' (1895); 'Unity in Christ' (1901).

Robinson, Lewis Wood, American naval officer: b. Camden County, N. J., 7 March 1840; d. Philadelphia, Pa., 16 Feb. 1903. He was graduated from the Polytechnic College of Pennsylvania in 1861, and entered the navy in that year as 3d assistant engineer in the West Gulf blockading squadron. He participated in the capture of Fort Jackson, Fort Saint Philip, and New Orleans; was engaged in the attack on Vicksburg and in the battle of Mobile Bay. After the war he continued in the naval service, was appointed chief engineer with rank of lieutenant-commander in 1883, became commander in 1895, captain in 1898 and in 1901 was retired with rank of rear-admiral.

Robinson, Philip (Stewart), English journalist: b. Chunar, India, 1849. He was educated

at Marlborough College, engaged in teaching and in journalism, and was special correspondent of the London *Daily Telegraph* in the Afghan and Egyptian wars. He was also special commissioner of the New York *World* in 1881-2, and during the Spanish-American war was in Cuba as correspondent of the *Pall Mall Gazette*. He has published: 'In My Indian Garden' (1878); 'Sinners and Saints' (1883); 'Some Country Sights and Sounds' (1893); 'Birds of the Wave and Woodland' (1894); 'In Garden, Orchard and Spinney' (1897); etc.

Robinson, Stillman Williams, American engineer and inventor: b. Reading, Vt., 6 March 1838. He was graduated from the University of Michigan in 1863, and for the three following years became assistant engineer in the United States Lake Survey. In 1866 he became attached to the University of Michigan in the department of geodesy and mining, and in 1870 was made professor of mechanical engineering at the University of Illinois, where he remained until 1878, when he assumed a similar post at the Ohio State University, and continued in its active duties until made professor emeritus in 1894. He has been an active inventor, and controls at least 40 patents. He invented the thermometer-graduating machine, and machines for shoe manufacturing, and has published: 'Teeth of Great Wheels and the Robinson Templet Odontograph' (1876); 'Railroad Economics' (1882); 'Strength of Wrought Iron Bridge Materials' (1882); 'Compound Steam-Pumping Engines, Analytical and Graphical Treatment' (1884); 'Principles of Mechanism' (1896); etc.

Robinson, Stuart, American Presbyterian clergyman: b. Strabane, near Londonderry, Ireland, 26 Nov. 1816; d. Louisville, Ky., 5 Oct. 1881. He was graduated at Amherst College in 1836, studied theology at Union Seminary, Prince Edward, Va., and was ordained in 1841. He was pastor at Kanawha Salines, W. Va., 1841-7, in 1856-8 professor of ecclesiology in the Presbyterian Seminary at Danville, Va., and then became pastor at Louisville. He edited the 'True Presbyterian,' which was suppressed by the government in 1862 for disloyalty, and he then removed to Toronto. In 1865 he published 'Slavery as Recognized by the Mosaic Civil Law, and Allowed in the Abrahamic, Mosaic, and Christian Church,' and in 1866 resumed his Louisville pastorate and reissued his paper as 'The True Christian Commonwealth.' His persistence in expressing his former views led to his expulsion from the Presbyterian general assembly, and by his influence the Kentucky synod joined the Southern general assembly in 1869, which body made him its moderator. He was a delegate to the Pan-Presbyterian council at Edinburgh in 1877. He wrote: 'The Church of God an Essential Element of the Gospel' (1858), and published 'Discourses of Redemption' (1866).

Robinson, Theresa Albertine Louise von Jakob, German-American author: b. Halle, Prussia, 26 Jan. 1797; d. Hamburg 13 April 1869. She was the second wife of Edward Robinson (q.v.), and was known in Germany as an author under the name of 'Talvj'. (formed from her initials. While residing at Kharkoff she began to study Slavonian, and wrote her

first poems. In 1825 she published a few tales in a volume bearing the title 'Psyche.' She also published, in 1825-6, translations of a number of Servian popular songs entitled 'Volkslieder der Serben.' In America she began the study of the aboriginal languages, and translated into German Pickering's work on the Indian tongues. In 1834 she wrote a 'Historical Review of the Slavic Languages' for the 'Biblical Repository,' republished in enlarged form in 1850. During her husband's visit to Palestine she resided in Germany, where she published, in 1840, 'Charakteristik der Volkslieder germanischer Nationen mit einer Uebersicht der Lieder aussereuropäischer Völkerschaften.' 'Die Colonisation von Neuengland' was published at Leipsic in 1847; a defective translation by W. Hazlitt, Jr., appeared in London in 1851. She also wrote numerous tales, and contributed to magazines, both German and English.

Robinson, William Callyhan, American jurist: b. Norwich, Conn., 26 July 1834. He was graduated from Dartmouth College in 1854; studied at the General Theological Seminary in New York, and entered the Episcopal ministry in 1857, but later studied law and was admitted to the bar in 1865. In 1869 he became instructor in the Yale Law School, and later professor of elementary and criminal law, and the law of real property. He was judge of the court of common pleas, New Haven, 1874-6, and member of the Connecticut legislature in 1874. Since 1895 he has been dean of the law school of the Catholic University of America. He has published: 'Notes of Elementary Law' (1876); 'Elementary Law' (1882); 'Law of Patents' (1890); 'Forensic Oratory' (1893); 'Elements of American Jurisprudence' (1900).

Robinson, Ill., city, county-seat of Crawford County, on the Wabash River, and on the Cleveland, C., C. & St. L. and the Illinois C. R.R.'s; 36 miles southwest of Terre Haute, Ind. It was settled in 1842, when it became the county-seat; was incorporated as a village in 1866, and as a city in 1886. It is the trade centre of a fruit and grain growing and sheep raising region, and contains a few small mills. It has two banks, with a combined capital of \$75,000, doing business to the amount of \$300,000 annually. It contains a public high school founded in 1885, with a school library of over 500 volumes (1903), and a Carnegie library. The city government is by a mayor and a council of six; the members of the council are elected for two years, three being chosen each year. Pop. (1900) 1,683; (1910) 3,863.

G. W. HARPER,
Editor of the Robinson 'Argus.'

Robinson Crusoe, a world-famous tale by Daniel Defoe, published in 1719, and supposed to have been suggested by the experience of Alexander Selkirk (q.v.), who was shipwrecked and lived for years on a desert island. Crusoe, an Englishman, goes to sea in his youth, is captured by the corsairs, is shipwrecked and washed ashore on an uninhabited island, formerly supposed to have been in the Pacific, but recently satisfactorily identified with Tabago in the Caribbean Sea. The narrative consists of a careful description of his adventures and experiences during the 28 years of his exile. The first volume ended with the return of Crusoe to England, and met with such remarkable suc-

cess that the author, four months later, brought out a second volume, entitled 'The Farther Adventures of Robinson Crusoe'; and this in turn was followed, one year later, by a third, relating his 'Serious Reflections' during his wanderings. The simplicity of style and the realistic atmosphere pervading the narrative, have caused the popularity of this book to remain unimpaired.

Robison, John, Scottish scientist: b. Baldernock, Stirlingshire, 1739; d. Edinburgh 30 Jan. 1805. He entered Glasgow University in 1750. In 1758, as private tutor to the son of Admiral Knowles, he accompanied the expedition under General Wolfe for the reduction of Canada. In this situation, besides instructing his pupil, he was employed in making surveys of the coasts and harbors on the river Saint Lawrence. In 1763 he resumed his studies at Glasgow, devoting himself to mechanics, to which he was influenced by his acquaintance with James Watts, then employed in perfecting the steam-engine. In 1766 he was appointed to the chair of chemistry in the university. Admiral Knowles having been recommended by the British government to the Empress Catharine of Russia to superintend the improvement of her navy, Robison accompanied him as private secretary in 1770. In 1772 he was appointed by the empress inspector-general of the corps of marine cadets at Cronstadt. In 1773 he accepted the chair of natural philosophy at Edinburgh, which he continued to fill till his death. His writings include 'Elements of Mechanical Philosophy' (1804); 'A System of Mechanical Philosophy' (1822); and many contributions to the third edition of the 'Encyclopædia Britannica.'

Rob'john, William James ('CARYL FLORIO'), American musician and composer: b. Tavistock, Devonshire, 2 Nov. 1843. He came to New York in 1857, and in 1858-60 was first boy soloist at Trinity Church, New York. He afterward went on the stage as a singer, was organist in several churches, and also conducted opera in Havana and in New York. He organized the Palestrina Choir in 1886, and in 1889-91 was musical director of Wells College, Aurora, N. Y. His compositions include cantatas, overtures, symphonies, chamber music, and sacred music, in addition to the operettas: 'Inferno' (1871); 'Les Tours de Mercure' (1872); 'Suzanne' (1876); and the operas: 'Gilda' (1879); and 'Uncle Tom's Cabin' (1882).

Rob'sart, rōb'särt, Amy, a character in Scott's novel, 'Kenilworth.' She is the unacknowledged wife of the Earl of Leicester, whom she follows to the castle of Kenilworth during the queen's visit; but there she is disowned, and is returning to her original place of concealment, when she meets the death prepared for her by Richard Varney.

Rob'son, Stuart, American actor: b. Annapolis, Md., 4 March 1836; d. New York 29 April 1903. His father's name was Charles Stuart, and he was christened Henry Robson Stuart. As a boy he acted as page in the House of Representatives during the 30th and 31st Congresses. Adopting the stage as a profession, he appeared first at the Baltimore Museum in 1852. He appeared in a play with William H. Crane in 1877 at the Park Theatre, New York, and their joint success led to a 12 years' partnership, during which time they produced 'Twelfth

Night,' 'The Comedy of Errors,' and 'The Merry Wives of Windsor,' besides other comedies and farces. In 1888 Bronson Howard wrote for them 'The Henrietta,' which was also played by Robson after their partnership ended. Plays in which he appeared as an independent star were 'Is Marriage a Failure?'; 'She Stoops to Conquer'; 'The Meddler' (1898) by Augustus Thomas; 'The Jucklins' (1900) by Opie Read.

Roburite, an explosive patented by Dr. Roth in 1887. It consists of dinitrochlor-benzene mixed with ammonium nitrate, and must be used dry. The detonation of the mixture is to be effected by means of fulminate of mercury. Roburite burns quietly, and is not sensitive to shock. Its most successful use has been in the mining of coal, where it is valuable not only because it causes little dust, but also because it allows of blasting the coal in large blocks.

Robusti, rô-boos'tê, **Jacopo**. See TINTO-RETTO.

Roc, rôk, a mythical bird of enormous size, supposed to have been able to perform wonderful feats of strength and ferocity. The most popular accounts of the roc are given in 'The Arabian Nights' Entertainments,' where the bird plays an important part in the fortunes of Sinbad the Sailor. Sinbad describes the roc as white, with a claw as large as the trunk of a large tree and with a beak of prodigious size and sharpness. Its egg, he declares to be 50 paces in circumference, about 150 feet. Another writer computes that the egg of the roc is equal to 150 hens' eggs. The bird is described as a bird of prey, 'able to bear an elephant away in its talons,' and 'killing the moa, which it bore to its nest and destroyed to provide food for its young.' See, in 'The Arabian Nights' Entertainments,' the accounts of the second voyage, and the third Calendar's Story. Attempts have been made to identify the roc with the so-called elephant-birds of Madagascar and New Zealand, but it is asserted by naturalists that neither this huge bird (which is not a bird of prey) nor the *Harpagornis*, the largest known rapacious bird, could have performed the feats commonly attributed to the roc. There was described to the Parisian Academy of Sciences the fossils of an enormous bird called the *Epyornis* and two of its eggs, fossil remains of which had been discovered. (See reports for first quarter, 1851.) This little-known colossal has been accepted as the nearest approach to the fabulous roc.

Roca, rô'ká **Julio A.**, Argentine statesman: b. Tucuman, Argentina, 1 July 1843. He was trained in the Paraná military school, entered the army, and in 1874 became general. In 1878-80 he was war minister, and as such headed in person the expedition which subdued the Patagonian Indians. From 12 Oct. 1880 to 12 Oct. 1886 he was president of the republic. It was during his administration that the serious Argentine financial crisis occurred.

Rocafuerte, rô - kâ - foo - âr'tâ, **Vincente**, South American statesman: b. Guayaquil, Ecuador, 3 May 1783; d. Lima, Peru, 16 May 1847. He was educated in France and England, and in 1812 was elected to the Spanish Cortes by Guayaquil, but his opposition to the policies of Ferdinand VII. was resented, and he was obliged to escape to France. He went to Lima, and to

the United States in 1819, and in 1824 to Mexico, where he became secretary to General Michelena. He accompanied him to England, and after the recognition of Mexico's independence and Michelena's return, he remained in England as *chargé d'affaires*. In 1830 he resigned and returned to Mexico, where he edited the 'Fénix de la Libertad.' He went to Guayaquil in 1833, and was soon after elected deputy to congress for the province of Pichincha, but was exiled because of his opposition to the administration. The province of Guayaquil then revolted against General Flores and proclaimed Rocafuerte as supreme chief. He was defeated and captured by Flores, but an amicable arrangement was soon afterward made, co-operation in the reorganization of the republic was agreed upon, and Rocafuerte served as president in 1835-9. His administration was one of ability. He introduced many reforms, and placed the financial affairs of the country on a sound basis. His after life was spent in various diplomatic missions, in which he sustained his high reputation as a statesman. He wrote: 'Idéas necesarias á todo pueblo independiente, que quiere ser libre' (1820); 'Ensayo sobre tolerancia religiosa bajo el aspecto político y como medio colonización y de progreso' (1831); etc.

Rocaille, rô-kal-ê'. See ROCOCO.

Roc'amboule, a species of onion (*Allium scorodoprasum*) having bulbs resembling those of the garlic; but the cloves are smaller. It is cultivated for the same purposes, and is considered as having a more delicate flavor.

Rocha Pitta, Sebastiao, sâ-bâs-tê-â'floo rôsh'a pêt'tâ, Brazilian author: b. Bahia, Brazil, 3 May 1660; d. near there 3 Nov. 1738. He was a leisurely student, and the author of some commonplace verse and fiction. He made very elaborate preparations for his 'Historia da America Portuguesa desde o seu Descobrimento até o Anno 1724' (1730), which won for him deserved success and numerous honors. The book was the first history of Brazil in any true sense, and the material it contained has proved of much value to subsequent workers in that field.

Rochambeau, rô-shân-bô, **Jean Baptiste Donatien de Vimeure**, COMTE DE, French marshal: b. Vendôme 1 July 1725; d. Thoré 10 May 1807. He was the son of the governor of his native town and was brought up for the church, but at 17 entered the army. He fought with distinction in the war of the Austrian Succession, attained the rank of colonel and in 1749 followed his father as governor of Vendôme. During the Seven Years' war he did excellent service in Minorca (1756) and later in Germany, winning the rank of brigadier-general. He was made lieutenant-general in 1780 and in the same year was despatched at the head of an army of 6,000 men to co-operate with the American forces in the War of Independence. In July he landed in Rhode Island and, intrenching himself at Newport, held his position till June of the following year, when, in pursuance of a plan of campaign arranged between Rochambeau and Washington, the French troops, reinforced by some 3,000 men, marched across Connecticut and joined the American army on the Hudson, whence was begun the southward march for Yorktown. The city was invested on 29 September and after two

brilliant assaults by the French troops and the defeat of the English fleet by the French under De Grasse in Chesapeake Bay, Cornwallis surrendered. Rochambeau's services to the American cause were enhanced by the utter absence of jealousy or self-assertion on his part; he placed himself implicitly under Washington's orders and within his own army maintained the sternest discipline. Congress voted its thanks to the French commander for his valuable services and presented him with two guns taken at Yorktown. Returning to France in 1783, he took part in the earlier events of the French Revolution and after being raised to the rank of field-marshal, was given in 1791, command of the Army of the North. Regarding with disfavor the progress of the Revolutionary policy, he resigned in June 1792 and soon after was imprisoned at Paris, regaining his liberty at the end of the Reign of Terror in 1794. In 1804 Napoleon made him an officer of the Legion of Honor. A statue of Rochambeau was erected at Vendôme in 1899, and a replica of it in Lafayette Square, Washington, was unveiled with much ceremony in 1902. He left behind him, 'Memoires du Marechal de Rochambeau' (1890), translated, in part, into English (1838).

Rochdale, roch'däl, a market-town and parliamentary borough of England, in Lancashire, 10 miles north-northeast of Manchester. The parish church of St. Chad, finely situated on a lofty height, and approached from the lower part of the town by a flight of 122 steps, is a spacious and venerable structure of the 12th century (restored in 1837), partly in the late Norman and partly in the Perpendicular style, with a square embattled tower, several windows of rich tracery, and some very ancient monuments. Rochdale is a place of considerable antiquity, and had a Roman station in its vicinity. Its woolen manufacture appears to have been introduced by the Flemings in the reign of Edward III., and having continued to flourish, is mentioned as famous in the reign of Elizabeth. The Rochdale Co-operative Store, which has about 12 branches in the town, was the first society of its kind, and has served as a model for other co-operative societies.

Rochdale Pioneers, or **Rochdale Society of Equitable Pioneers**. See CO-OPERATION.

Roche, rôch, Alexander, Scottish artist: b. Glasgow 17 Aug. 1863. He began life as an architect, but turning his attention to painting, studied at Paris, and is now corresponding member of the Munich Secession. He has painted in landscapes and genre, and among his pictures are: 'Tête-a-Tête,' which carried off a gold medal at Munich in 1889; 'Fishers' (1891), bought by the Berlin Gallery; 'Landscape,' awarded a gold medal at Dresden (1897); 'Prue' (1902), bought by the Munich Gallery. He also executed the frescoes in the Banqueting Hall, Glasgow Municipal Building, 1900. He has published 'Finish in Art' (Transactions of the National Association for the Advancement of Art, 1889).

Roche, James Jeffrey, American author and editor: b. Mountmellick, Queen's County, Ireland, 31 May 1847; d. Berne, Switzerland, 3 April 1908. He was educated at Saint Dunstan's College, Charlottetown, P.E.I. In 1883-90 he was assistant editor of the Boston

'Pilot,' and editor-in-chief 1890-1905. He was U. S. consul at Genoa, Italy, 1904-7 and at Berne 1907-8. He published: 'Songs and Satires' (1886); 'The Story of the Filibusters' (1891); 'Her Majesty, the King' (1898); 'By-ways of War'; 'Sorrows of Sap'ed' (1904); etc.

Roche, Regina Maria (Dalton), Irish novelist: b. south of Ireland about 1764; d. Waterford 17 May 1845. She attained sudden fame in 1798 by the publication of her four-volume story, 'Children of the Abbey,' much in the fashion of the 'Mysteries of Udolpho,' which it rivaled in popularity. She then set to work on a long series of similar books—'The Nocturnal Visit' (1800); 'The Tradition of the Castle' (1824); 'The Nun's Picture' (1834), and a dozen others.

Roche, rôsh, Troilus de Mesgouat, MARQUIS DE, French colonizer in America: b. France 16th century; d. Brittany after 1600. In 1598 he received from Henry IV. letters-patent creating him lieutenant-general of Canada and adjacent islands, with power to establish colonies anywhere in North America. With a crew drawn largely from French prisoners, he set sail with one Chedotel of Normandy as pilot. After landing 40 of his force on Sable Island, he explored Acadia. Head winds prevented a landing at the island, on his return; and sailed on for France, where he was impressed for a year. Chedotel was ordered to go in search of the 40 followers, who had fortunately made their escape by means of wrecked vessels found on the coast.

Rocheftort, Henri, ôh-rê rôsh-fôr (VICTOR HENRI, MARQUIS DE ROCHEFORT-LUCAY), French journalist and politician: b. Paris 31 Jan. 1831. He became known as the author of successful vaudevilles and farces and as a contributor to *Charivari*, *Figaro*, and other Parisian periodicals, wherein his political reviews were marked by a brilliancy of wit and audacity of attack that brought upon him the resentment of the government. His assaults on Napoleon III. led the emperor to demand his expulsion from the staff of *Figaro*. Rocheftort thereupon (1868) founded a weekly of his own, 'La Lanterne,' in which he continued his assaults on the government with unrivaled weapons of sarcasm and ridicule, beneath which the emperor and his ministers were helpless. The 'Lanterne' attained an enormous circulation, and when the editor was forced by repeated sentences of the courts to take refuge in Belgium, he continued its publication in a spirit all the more acrimonious. In 1869 he was elected to the Corps Législatif, and established the 'Marseillaise' with the professed object of combating the Second Empire. In January 1870 he was imprisoned for inciting to insurrection. After the fall of the Empire he became a member of the government of national defense, but was out of sympathy with the conservative tendencies of that body and strongly inclined to the radical element that afterward brought forth the commune. In May 1871 Rocheftort fled from Paris, but was captured and sentenced by a court-martial to deportation. In 1873 he was transported to New Caledonia, but escaped in the following year, lived in Belgium and Switzerland, and renewed the publication of the 'Lanterne.' In 1880 he returned to Paris and founded the 'Intransigeant,' a periodical of virulent protest. He was deputy in 1885-6, be-

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came an ardent supporter of Boulanger, and in 1889 was sentenced to imprisonment, but escaped to England. He returned under amnesty in 1895, and attracted public attention as one of the most violent opponents of Captain Dreyfus (q.v.) in that celebrated affair. He published 'Les Aventures de ma Vie' (1896).

Rochefort, or **Rochefort-sur-Mer**, France, chief city of an arrondissement of the department of Charente Inférieure. It is notable for its naval and army institutions, and its well-built public works. It has two harbors—military and commercial. Napoleon purposed embarking for America from this point, but his plans were frustrated. The manufactures include tiles, beer, candles, artificial flowers, naval clothing. There are also various metal foundries, etc.

Rochefoucauld, rōsh - foo - kō, **François**, DUC DE LA. See LA ROCHEFOUCAULD.

Rochegrosse, Georges, zhōrzh rōsh-grōs, French painter: b. Versailles 1859. He studied at Paris, and developed under Lefebvre and Boulanger a powerful naturalistic style with an almost startling brilliancy of technique. His tendency to the brutal side of tragedy in his choice of subjects is, however, frequently revolting, and his pictures too frequently swim in blood. Among the best known and most characteristic are: 'The Death of Geta, Emperor of Rome,' and 'The Fall of Babylon.'

Rochejacquelein, rōsh-zhāk-lāñ, **Henri de la**. See LA ROCHEJACQUELEIN.

Rochelle, rō-shēl', Ill., city in Ogle County; on branches of the Chicago, Burlington & Quincy railroad; about 70 miles west of Chicago, and 150 miles north of Springfield. It is the commercial and trade centre of a fertile agricultural region, in which stock-raising is an important industry. The manufacturing interests are connected with farm products. It has a high school, public elementary schools, and a public library. Pop. (1910) 2,732.

Rochelle, La, la rō-shēl', France, chief town of the Charente-Inférieure, a fine port and strongly fortified. It carries on a trade, the value of whose imports amounted in 1899 to almost \$13,000,000; its exports to more than \$5,000,000. Rochelle played an important role in the Reformation period, resisting many assaults, but was finally forced by famine to succumb (1628).

Rochelle Salt, sodium potassium tartrate, a white crystalline substance, discovered by Seignette, an apothecary of Rochelle, France. It has a mildly saline and slightly bitter taste, and is much used as a laxative, especially in seidlitz powders.

Roches Moutonnées, rōsh moo-tō-nā', bosses of rock smoothed and rounded by glacial action. Such protuberances occur as scattered knobs and undulating surfaces in former glacial areas. Those little acted on by the weather generally show the characteristic glacial scratches and groovings. Some are smoothed and polished all over, and have the appearance of whales' or dolphins' backs; others are smoothed only on the side which faces the direction from which the glaciating agent flowed; the other side, protected from abrasion, being left in its rough unpolished condition. The name is fancifully

applied because such rocks in a valley bottom, when seen from above, have a seeming resemblance to the rounded backs of sheep lying down.

Rochester, rōch'ēs-tēr, **John Wilmot**, 2D EARL OF, English poet and courtier: b. Ditchley, Oxfordshire, 10 April 1647; d. Woodstock Park, Oxfordshire, 26 July 1680. On his father's death in 1658 he succeeded to his titles and estates, the latter of which he soon dissipated. Having studied at Oxford, he served with credit in the fleet under Lord Sandwich at the attack on Dutch ships in the harbor of Bergen, but subsequently gave himself up to dissipation, and became the personal friend and favorite of Charles II., who is said to have encouraged and shared many of his exploits. He frequently fell into disgrace at court, though his pardon was not long in forthcoming. His constitution at length gave way, and at 30 he was visited with all the debility of old age. He lingered for some time in this condition, and died, after sending for Bishop Burnet and professing great penitence for his misspent life. The volume of obscure verse purporting to be his contains much that is spurious. He was no better and rather worse than the lax writers of his day; but the edition of his poems brought out by his friends in 1691 contains such exquisite lyrics as entitle him to rank as the best song writer between Carew and Burns. He wrote the famous epigram on Charles II., asserting he "never said a foolish thing and never did a wise one."

Rochester, Nathaniel, American pioneer: b. Cope Parish, Westmoreland County, Va., 21 Feb. 1752; d. Rochester, N. Y., 17 May 1831. Having gone in 1763 to Granville County, N. C., he was made a member of the committee of safety for Orange County in 1775, in 1776 was a member of the first provincial convention in North Carolina, and was appointed by the convention a deputy commissary-general of military and other stores. He soon afterward resigned and was elected to the North Carolina legislature. In 1783 he established various manufacturing enterprises at Hagerstown, Md., and in Maryland became a member of the assembly, judge of the county court, and a presidential elector. Independently and in association with others, he purchased tracts of land in western New York, including (1802) one of 100 acres in Falls Town. He removed (1810) to Livingston County, near Dansville, and (1815) to Bloomfield, Ontario County. In April 1818 he went to Falls Town, which had been named Rochester in his honor; and in 1821-2 was the first representative of Monroe County in the State legislature. Consult Rochester, 'Early History of the Rochester Family in America' (1882).

Rochester, England, in the county of Kent, a river port on the Medway, 29 miles southeast of London. Its ancient castle (11th century) on an eminence overlooking the river, commands the view of a vast expanse of the surrounding country. The great tower of this ruined castle is one of the finest specimens of Norman architecture extant. The cathedral founded by Saint Augustine in 604 presents a mixed style, as it was destroyed by the Danes, and parts were added and remodeled subsequently at various epochs. There are many monuments of great antiquity. Of secular buildings, the town hall, exchange, municipal buildings

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and almshouses, schools, and Working Men's Institute are the most important. There is a large shipping trade, a steam-engine manufactory, and other industrial establishments, and lucrative oyster fishing. The town was founded by Ethelbert. The castle was built by Henry III. Henry VIII. visited Rochester, accompanied by Charles V., and Elizabeth spent five days there in 1573. Dickens introduces Rochester into 'Pickwick,' 'Edwin Drood,' and others of his novels.

Rochester, Minn., city, county-seat of Olmsted County; on the Zumbro River, and on the Chicago & N. and the Chicago and G. W. R.R.'s; about 92 miles southeast of Saint Paul and 45 miles west of Winona. It was settled in 1854 by James Bucklin and Mr. Proudfoot, and incorporated as a city in 1858. The city was visited by a cyclone in 1883, which caused the death of 27 persons and the loss of a large amount of property. It is in a productive agricultural region, in which wheat is one of the principal crops. Considerable attention is given to stock-raising. The chief manufacturing establishments are flour and grist mills, a foundry, and machine shops. There are large grain elevators and stock yards. The principal buildings are the court-house, municipal building, Masonic Temple, Odd Fellows' building, opera house, Saint Mary's Hospital, a number of churches, and the convent of the Sisters of Saint Francis. The educational institutions are the high school, public and parish elementary schools, private commercial schools, Notre Dame de Lourdes Academy (R. C.), founded in 1877, and four libraries. The three banks have a combined capital of \$200,000; and the annual business amounts to \$1,500,000. The government is vested in a mayor, alderman-at-large, and a council of six members, three of whom are chosen by popular vote each year. Pop. (1910) 7,844.

A. W. BLAKELY,
Editor 'Post and Record.'

Rochester, N. H., city in Strafford County; on the Cocheco and Salmon Falls rivers, and on four railroads, all operated by the Boston & Maine railroad; about 30 miles east by north of Concord, and 35 miles northeast of Manchester. It was settled in 1722 by emigrants from England; incorporated as a town in 1722 and chartered as a city in 1891. It is the commercial and industrial centre of a large part of Strafford County; the chief manufacturing establishments are shoe factories, which have 1,000 employees; woolen mills, 400 employees; brick works, box factories, and other manufactories having fully 500 employees. The trade is chiefly in its own manufactures and in farm products. The principal public buildings are the Gaffney Home for the Aged, the 13 church buildings, and the schools. The educational institutions are a high school, public and parish schools, private commercial schools, and a public library. The three banks have a combined capital of \$150,000. The government is vested in a mayor and a council of 18 members. The members of the council hold office three years, six being elected each year. Pop. (1910) 8,868.

WILLIS M. DUFFEE,
Editor 'Rochester Courier.'

Rochester, N. Y., city and county-seat of Monroe County, on the Genesee River and

the Erie Canal, and on the New York Central and Hudson River, the West Shore, the Lehigh Valley, and the Erie, and other railways; 229 miles west of Albany. Almost in the centre of the city are the Upper Falls of the Genesee. The city lies on a plateau, 263 feet above Lake Ontario, and is built on both sides of the river.

The Genesee River.—Midway through Rochester runs the Genesee, which is spanned by 10 bridges within the city limits, the middle one of which, built of stone, is enclosed by stores on both sides, but the others, of iron construction on stone piers, are open, affording beautiful and diversified views of the river, particularly from the northernmost bridge, whence can be seen a winding gorge nearly 200 feet deep. The sides of this display several distinct geological strata, showing the gradual formation of the earth, the red Medina sandstone being plainly visible as it rises from the water's edge for more than half the height of the precipice, when it gives place to successive layers of green shale, limestone, hematite iron ore, green and purple shale, and finally a topmost crust of limestone, all belonging to the Upper Silurian Age. At the point referred to are the lower falls, about 80 feet high, a curtain of water more beautiful, though less imposing, than the principal cataract, two miles farther back, in the centre of the city, from which, with its sheer descent of 96 feet, Sam Patch jumped to his death in 1829.

The Erie Canal.—Crossing the city from west to east is the Erie Canal, completed in 1825, which spans the river by means of an aqueduct of pleasing proportions, built of Lockport limestone at a cost of \$600,000. This canal, the surface of which at this point is 506 feet above tide-water, was, for many years after its construction, the great highway of commerce through the State, carrying to the eastern seaboard the cereal products not only of this region but of the growing West and enriching Rochester as well as other places on its banks. Wholly as a means of travel and largely as a medium of traffic its function was long ago appropriated by railroads, of which 11 enter the city.

Parks.—The Rochester Park Commission was created in 1888, since when work has been done so judiciously by the aid of the best landscape architects and nurserymen, taking advantage of the rolling lands that were obtainable, that few cities present so attractive an appearance in this regard; there are now three principal parks—the Genesee Valley, Seneca, and Highland—besides 11 smaller locations, making in all 666 acres of park territory.

Public Buildings.—There are four well-equipped hospitals—the City, Saint Mary's, the Homœopathic, and the Hahnemann—besides a municipal hospital for contagious diseases and the insane asylum, or State Hospital. There are numerous hotels—of which the largest are the Powers, the Whitcomb, the Bristol, and the Osburn—and many apartment houses, which are greatly in demand. Of legitimate theatres there are four, the Lyceum and the Cook on the east side of the river, the National and the Baker on the west. Six daily newspapers are published here—the *Democrat and Chronicle*, the *Herald*, the *Union and Adver-*

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tiser, the *Post Express*, the *Times*, and the *Abend Post*—besides a large number appearing less frequently. Of the social clubs the principal are the Genesee Valley, the Rochester, the Eureka, the Rochester Whist, and the Columbia Rifle; of literary clubs the leading ones are the Pundit, the Fortnightly, and the Wednesday Morning.

Manufactures.—Rochester was built up by the milling industry; the quality and amount of wheat grown in the valley during the early days made a demand for flouring-mills, which was strengthened by the presence of the high falls, so that those structures sprang up rapidly on both banks of the river and became so numerous that the place was long known as "the flour city" and its preeminence in this respect was recognized throughout the country. The development of the enormous wheat-fields of the West caused a decline in this business, so that its relative position was taken by the nursery industry; this was started here in 1838, after which it increased so that in 1904 there were more than 30 firms engaged in the business; besides the nurseries there are several large seed-houses, Rochester being the foremost city in the world in this regard; the first trees sent to California went from here in 1849. Rochester is the home of the camera, and practically all of the film cameras that are made in the world are manufactured here, as well as the great majority of plate cameras; in other photographic apparatus, in optical instruments, and in fruit canning it also leads all other places on the globe. Although Rochester is only the 24th city in the United States in point of population, it is the first in many things; it ranks third as to clothing, with an annual output of \$10,000,000, and fourth as to boots and shoes, with a production of \$7,000,000; its total manufacture exceeds \$70,000,000 annually, with over \$50,000,000 invested in that and the wholesale trades. The receipts at the post-office for a year are \$625,000; 640,000 tons of bituminous coal and over 360,000 tons of anthracite are consumed and shipped from here annually.

Banking and Commerce.—In the promotion of trade and in the inducement of outside manufacturers to locate in Rochester an important factor is the Chamber of Commerce, organized in June 1888, which now has a membership of 389. For providing the money necessary to carry on the business above indicated there are eight banks and five trust companies, with a combined capital of \$3,025,000, besides four savings banks, the total resources of all these institutions being \$103,124,410.73; the amount passing through the clearing-house in 1900 was \$194,385,300. For 1910 the assessed valuation of real estate was nearly \$165,500,000 (75 per cent of actual value), the tax rate \$1.93, and the net public debt \$12,742,267.

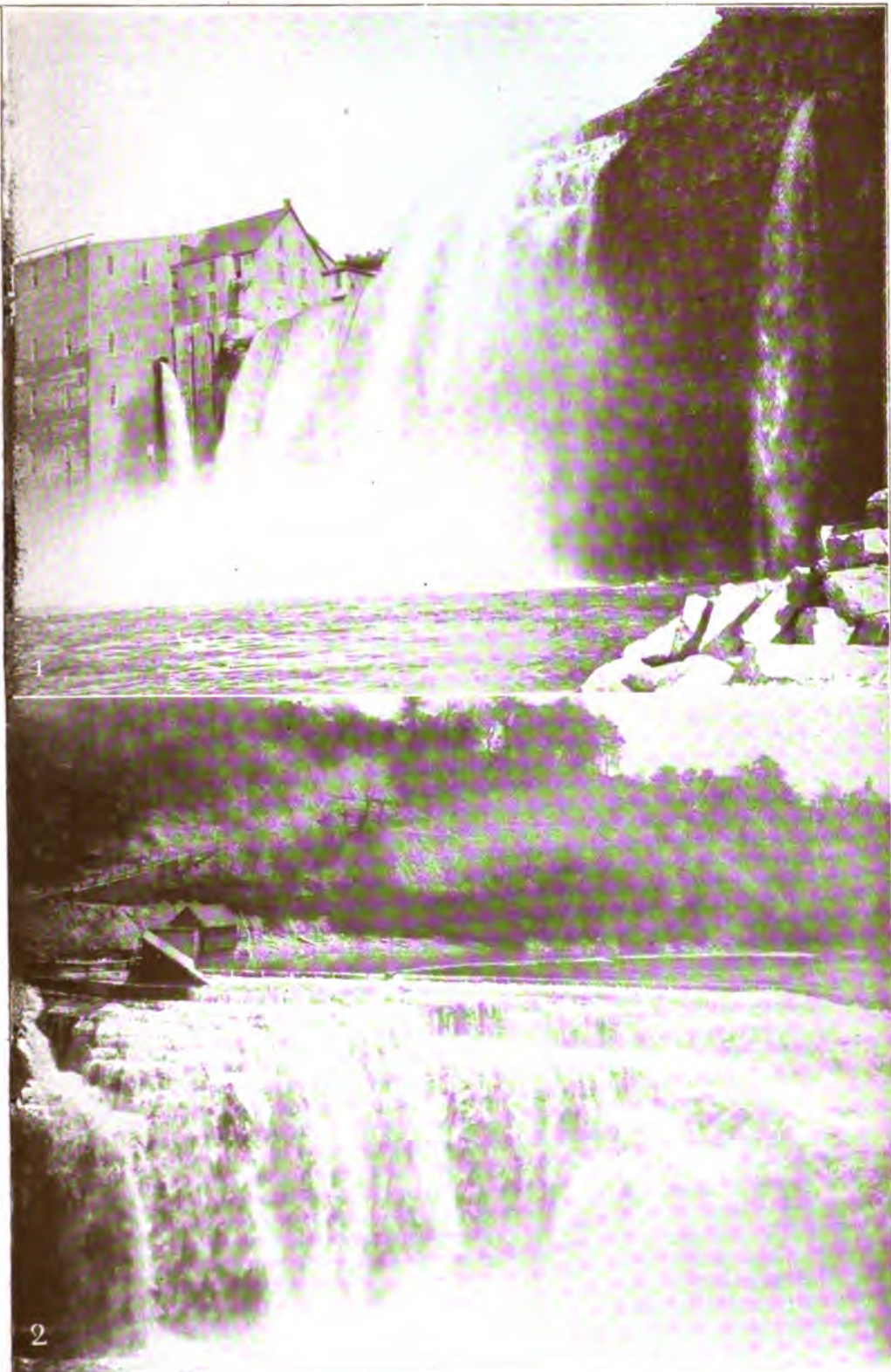
Education.—The Rochester Athenæum and Mechanics' Institute—generally known by the latter part of its title—was founded in 1885 as a free drawing-school and has so expanded that it now gives instruction in practical arts and sciences to about 4,000 pupils and ranks fourth among the technical trade schools of the country. The University of Rochester, founded in 1850 and located in beautiful grounds in the eastern part of the city, has a faculty of 23 instructors, with 264 students, and a library

of 41,000 volumes. There are also the Rochester Theological Seminary, of the Baptist denomination, founded in the same year, with a present faculty of 11, over 100 students, and 32,000 books; Saint Bernard's (Roman Catholic) Theological Seminary, occupying capacious grounds north of the city, started in 1893, having now 13 professors, 145 students, and 15,000 volumes, and the Wagner Memorial Lutheran College, chartered in 1885, having at present five professors and about 50 students. The public school system, under the control of a board of education of five members, is among the best in the country; it maintains 34 buildings, with as many principals; during 1903 there were 606 teachers, with 26,325 registered pupils; the East Side high school was lately completed at a total cost of \$322,000; the expenditures of the board are more than \$765,000. There are also 18 parochial schools and many private ones, including three academies—two of them for girls, one for boys—and one large institution for the instruction of deaf-mutes. The only free public library is the Reynolds, with 52,000 volumes, mainly books for reference and consultation.

Churches and Charities.—There are over 100 churches in Rochester. The first congregation (Presbyterian) was formed in 1815; the Roman Catholic diocese of Rochester was created in 1868. Of the seven cemeteries the oldest is Mount Hope, opened in 1838, remarkable for its natural beauty, owing to the undulations of the ground in every direction. There are five orphan asylums, three of which are under Catholic control, one under Jewish. In 1822 the Female Charitable Society was organized, from which have risen the kindred institutions of to-day, including, besides the hospitals and asylums, the Industrial School—not to be confounded with the State Industrial School, a large establishment for the reformation of young criminals—the Home for the Friendless, the Humane Society, the Children's Aid Society, the Society for the Organization of Charity, and a host of other associations for relieving distress, the most of which are connected, more or less directly, with the various churches.

Public Service.—In 1873 the Holly system of waterworks was introduced for fire protection. In the same year pipes were laid to Hemlock Lake, 28 miles away, by which water is obtained for drinking and other purposes that is unsurpassed, possibly unequaled, in its purity by any other city in the United States; 22,000,000 gallons are delivered daily; there are within the city limits 290 miles of distributing mains, with 300 miles of subsidiary pipe, and 3,050 hydrants; the total cost of the works was over \$7,500,000. The street cleaning is done by water-carts, instead of by the unsanitary means of dust-raising brooms. It is probably owing, partly, to the agencies just described that Rochester is one of the most healthful cities of the Union, the annual death rate during five years averaging 13 to the 1,000. The police force consists of 193 uniformed men; the fire department has 201 men, with 12 steamers and hose-carts, five truck companies, two chemical engines, one water tower, three separate hose companies, and one protective. The meteorological records of the past 33 years show that the mean annual temperature was 47.3, the mean maximum 55.4

ROCHESTER.



1 The Falls of the Genesee, Upper Falls.

2. The Falls of the Genesee, Lower Falls.

ROCHESTER — ROCHESTER THEOLOGICAL SEMINARY

the mean minimum 39.2, the absolute maximum 99, the absolute minimum 14 below zero, the mean annual precipitation 34.5 inches, the average number of clear days annually 83, partly cloudy 126, cloudy 156.

Rochester has always been free from overwhelming calamities. The worst two disasters, financially, in its history, in neither of which was a single life lost, were the great flood of 17 March 1865, when much of the city was under water for two days, doing a million dollars' worth of damage, and the fire of 26 Feb. 1904, which devastated a large portion of the dry goods district and inflicted a loss of \$3,000,000. Rochester has a well-equipped electric street car system, with 103 miles of track, besides the lines that run to surrounding villages in every direction. There are two telephone systems in the city, one owned by a foreign corporation, the other a home enterprise, which, though new, is very successful.

History.—In 1789 a saw-mill and a grist-mill were built on the west bank of the river by Ebenezer Allan—commonly called "Indian Allan," from his life-long association with the savages—who received, as compensation for the work, from Phelps and Gorham, the owners of the land, 100 acres surrounding those pioneer structures. Though no settlement was made at the time, that tract became the nucleus of the future city. In 1803 it was bought by Col. Nathaniel Rochester, Col. William Fitzhugh, and Maj. Charles Carroll, all of Maryland, for \$17.50 an acre. Some scattered dwellings were built in the vicinity within the next few years, but no house was erected in what was then called Rochester, after the first-named proprietor, till 1812, when a log cabin was built on the spot that has ever since been known as the Four Corners. Other residences soon went up, in one of which the first white child was born, 2 Dec. 1814. Settlers from the New England States came pouring in and when the first census was taken in December 1815, the population was shown to be 331.

In 1817 it was incorporated as a village, under the name of Rochesterville, but in 1822 the title was changed to Rochester. In 1823 the size of the village was augmented by taking in a part of the town of Brighton, on the east side of the river, and subsequent additions have so increased the area that it now embraces 11,365 acres, with 325 miles of open streets, 126 miles of which are improved, with 230 miles of sewers. It was incorporated as a city in 1834, the first mayor being Jonathan Child. Rochester was the birthplace of modern Spiritualism, the famous Fox sisters having given here, in 1849, the first manifestations of mysterious rappings, which speedily became known as the "Rochester Knockings."

During slavery times Rochester was one of the centres of the Abolition movement and one of the principal stations of the "underground railroad." It was the home of Frederick Douglass, the celebrated negro orator, and was the place in which William H. Seward (q.v.), in 1858, uttered, in a public address, his memorable phrase in speaking of the struggle between freedom and slavery as an "irrepressible conflict between opposing and enduring forces."

Population.—In 1900, Rochester ranked 24 in the list of cities in the United States. The

population in 1820 was 1,502; (1825) 5,273; (1834) 12,252; (1880) 89,363; (1890) 133,896; (1900) 162,608; (1910) 218,149. This shows an increase between 1890 and 1900 of 21 per cent, and between 1900 and 1910 of 34 per cent.

Bibliography.—Bragdon, 'Notable Men of Rochester and Vicinity' (1902); Ward, 'Churches of Rochester' (1871); Peck, 'Landmarks of Monroe County' (1895); Parsons, 'History of Rochester Presbytery' (1889); Mathews, 'Fire Service of Rochester' (1888); Parker, 'Rochester, a Story Historical' (1884); Peck, 'History of Rochester' (1884); O'Reilly, 'Sketches of Rochester' (1838); Peck, 'History of the Police Department of Rochester' (1903); *Union and Advertiser Year Book* (1888-1903); *Annual Reports of the Rochester Chamber of Commerce* (1888-1903).

WILLIAM F. PECK,

Author of 'The History of Rochester.'

Rochester, Pa., borough in Beaver County; at the junction of the Ohio and Beaver rivers, and on the branches of the Pennsylvania railroad; about 25 miles northwest of Pittsburg. It is connected by electric lines with Beaver, Beaver Falls, New Brighton, and other nearby places. A bridge across Beaver River connects the borough with Bridgewater. Also one across the Ohio connects the town with Monaca. It is in the coal and oil region, and in the vicinity are deposits of fire-clay and building-stone quarries. The chief manufactures are flour, lumber, brick, glass ware, foundry products, mining tools, structural iron, and oil well supplies. The principal public buildings are the churches, schools, and Masonic Temple. Pop. (1910) 5,903.

Rochester Theological Seminary, founded at Rochester in 1850 by the New York Baptist Union for Ministerial Education. As early as 1847 an attempt was made to remove Madison (now Colgate) University from Hamilton to Rochester, but this was opposed by the Baptists of Hamilton and legal obstacles were found, so that the plan was abandoned. The University of Rochester (q.v.) was established at the same time by the Baptists, and for a time the two institutions occupied the same buildings, but there has never been any organic connection between the university and the seminary, the latter being essentially a professional school. The regular course is three years; instruction is given in the departments of Hebrew language and literature (Old Testament), theology, church history, New Testament, homiletics and pastoral theology, elocution, English Bible, and Christian ethics. Graduation from college or preparation in Greek sufficient for the study of the Greek Testament is required for admission; formerly there was an English course for those who had no classical training; this was abandoned in 1889-90. In 1852 a German department was organized; the course is literary as well as theological, and covers six years. The seminary was at first without endowment, and at the end of 10 years had only \$75,000; in 1910 the productive funds amounted to \$1,691,000. The library is one of value, including the whole collection of Neander, the German church historian, and numbering 37,500 volumes. The total number of students including the German department was 167 in 1910.

Rochester, University of. See UNIVERSITY OF ROCHESTER.

Roch'et, the name given a lawn or lace garment, somewhat like the surplice in shape, but with close-fitting sleeves, worn by bishops, abbots, prelates, and other ecclesiastical dignitaries.

Rochette, Désiré Raoul, dā-zē-rā rā-ool rō-shét, French archaeologist: b. Saint-Armand, France, 9 March 1790; d. Paris, France, 3 July 1854. He was educated at Bourges, removed to Paris in 1811, in 1815 became assistant professor to Guizot, whom he afterward succeeded in the chair of history at the Sorbonne. In 1826 he became professor of archaeology at Paris, and in 1838 was elected permanent secretary of the Academy of Fine Arts. He gained a wide reputation for learning, was popular as a lecturer, and enjoyed high favor after the Restoration. Besides his unfinished history of ancient art he wrote 'Antiquités du Bosphore Cimmerien' (1822); 'Tableau des Catacombes du Rome' (1837); 'Lettres archéologiques sur la Peinture des Grecs' (1840); 'Mémoire sur l'Acropole d'Athènes' (1845); 'Mémoires d'Archéologie comparée, Asiatique, Grecque, et Etrusque' (incomplete, 1848); etc.

Rock-Bass. See BASS.

Rock-Brake. See FERNS AND FERN-ALLIES.

Rock Crystal. See QUARTZ.

Rock Dove, or Rock Pigeon. See PIGEON.

Rock Drills. The steam or rock drill is known to-day as an American invention and its inception dates back to the excavation of the Hoosac Tunnel in Massachusetts. This enterprise was fathered during its period of construction by the State of Massachusetts and was beset with enormous difficulties. To commence the excavation of a tunnel five miles long through hard rock, and to do the drilling by hand, was an audacious proposition. Still this was undertaken by the State of Massachusetts. In those days of inexperience, many methods of excavation were proposed and tried. Machines were built, tested and condemned. Among the inventors, the man who schemed the machine which in general features embodied the requirements of a perforator for making holes for blasting, was Mr. Fowle, of Boston. He constructed the first machine in which the drill used was made the extension of the piston rod of a reciprocating steam engine, which was moved forward toward the rock as the drilling advanced. The drill had a slow rotary as well as a reciprocating motion to insure the boring of a round hole. With this beginning, machines were improved in details, but operated without notable economy. The drills were heavy and could be used practically only when mounted on heavy carriages running on wheels on a track. They were much too heavy for mine or quarry work, although a few were used for such purposes.

Later came a demand for a lighter machine, and the Little Giant and Eclipse machines, both built by the Ingersoll-Rand Company, of New York, were found useful. The Little Giant was operated by a positive motion valve, and the Eclipse by a piston valve. With the introduction of light drills came various improvements which were found to be invaluable as the scope for the use of the rock drill enlarged. In fact, almost a new drill was made when the

machines were applied on a large scale in New York city for outside excavation at a tunnel under 42d street and under Hell Gate, and also in the hard ore mines of Lake Superior.

As soon as the rock drill attained a reasonable state of perfection, its improvement was immediately manifested to the world at large. It has often been called the advance agent of civilization, and it undoubtedly has a better claim to that title than any other mechanical invention of recent date. All modern engineering is dependent on its use, and problems which would be impracticable without this machine are rendered easy. Its influence on mining, quarrying, railroading and navigation has been felt all over the world. The rock drill has developed the mines of South Africa; and such modern engineering feats as the Hoosac and Mount Saint Gothard Tunnels, Hell Gate, Niagara Tunnel, the tunnel under Bergen Hill and the Palisades, the Croton aqueduct and the Chicago drainage canal were carried to success by rock drills. The work done by the rock drill may be said to be from 60 to 150 lineal feet of hole drilled per day of 10 hours in ordinary stone, including shifting and setting up of the drill, cleaning holes, etc. In tests and special cases the figures have been largely exceeded, sometimes as much as 400 lineal feet being made. Records of 24 inches per minute are not uncommon, all, of course, for down holes in favorable rock, but 70 feet per day of 10 hours in granite, including moving and setting up, averages a fair working basis. The cost of drilling in this way may be stated to vary from 2½ to 13 cents per lineal foot, according to local conditions. From four to five cents per foot of hole drilled may be taken as the working figure for general calculations, and this includes all expenses. Compared with hand methods, the cost of which runs from 25 to 70 cents per foot, with an average of 40 to 65 cents per foot of hole in hard rock, this shows that a given amount of drilling may be accomplished by the rock drill for from 1/4 to 1/12 the cost of doing it by hand. There are two distinct methods of machine drilling, one the auger drill, which bores the rock, and the other the percussion drill, such as the Little Giant or Eclipse, working by direct impact, that is, by striking repeatedly in the same spot and by simply bruising or chipping away the rock. Experience has proved that a reciprocating drill operates with the greatest economy and efficiency. The following are improvements made in the rock drill as used to-day.

Commencing with the cylinder of the drill, the method of using long bolts to hold the top and bottom heads in place with an elastic or spring buffer, whereby the blow (struck accidentally upon either head by the piston) is absorbed, may be placed first. The method of gripping the steel and the chuck by means of the "U" bolt and chuck key stands second. The device of flanged and rotating bar dropped through the ratchet box marked a great advance in the art. The use of the taper throttle was also a very neat device for preventing leakage and providing a graduated admission of the working fluid. In passing from the cylinder to its mounting the most important achievement was in the very simple device of mounting the drill on the horizontal arm attached to a vertical column, which in turn was

ROCK EXCAVATING MACHINERY

mounted to a block and jacked in place by two screws, one on either end of the block. A kindred invention was the universal joint applied to the legs of a tripod.

The requirements of a perfect rock drill are numerous, but it should first of all be simple in construction and strong in every part. The parts as far as possible should be so arranged that any broken or worn portion may be easily removed and a new part substituted, causing the least possible delay in the work. The drill should occupy but little space and should be light enough for easily handling. The mountings on which it is set for different kinds of work should be easily put up and easily removed, insuring a great range of adjustability. It must, of course, be economical in its use of the driving fluid and must put down a hole in the shortest possible time.

Surface and Underground Work.—Surface work includes that class of excavation which occurs in open air, and underground operations include such borings as are underground. Surface drilling may be applied for opening up canals, for quarrying purposes, for opening up ways for railroads and similar undertakings. Such work may necessitate the use of tripod, column and shaft bar, quarrying machines, channelers, gadders and the like. Underground work necessitates the use of rock drills and compressed air machinery for purposes of sinking shafts, opening mines, etc. In shaft sinking and tunnel work, as in driving headings and enlarging, it has been found that the column is the best means of mounting rock drills. These columns are simply round, extra heavy, wrought steel tubes with a suitable claw-foot or rosette on one end and either one or two clamping or jack screws on the other. Stopping bars and tripods are also extensively used for special features.

Submarine Work.—Submarine or subaqueous rock excavation is essential for converting shallow rivers and harbors into navigable waterways. The conditions under which submarine rock excavation must be done are difficult to the last degree, calling for special apparatus of unusual strength and endurance. This character of work is nearly always carried on where tides, currents, winds and storms are present in a varying degree, and these elements are practical obstacles to rapid and economical work. But add to these troubles deep water, irregular bottom covered over with mud, sand and other shifting material, which fills in almost as fast as removed, and the undertaking is seen to be extremely difficult. In the early days, the usual method was to lower explosives to the surface of the rock and attempt fracturing by surface blasting. Later a form of drop bore was introduced by means of which holes were drilled and charges inserted as is at present done. Still another form consisted of a very heavy cast iron bar tipped with a sharp steel point, which was raised and allowed to drop. In operation the sharp point strikes the rock and is supposed to break off a certain amount with each blow. This system is used to some extent abroad, even to-day, but in America it has been abandoned entirely for the more progressive method of drilling a hole and inserting the charge of explosive the same as is done in rock excavation on land.

The removal of submarine rock is daily

becoming a more important feature owing to the increasing depth of ocean and lake-going vessels demanding deeper channels for harbors and rivers. A barge, scow or float fitted with a suitable frame to support the drill guides, drill, boilers and other auxiliary apparatus, is usually employed in submarine excavation. The barge is towed into place and anchored by means of cables, anchor chains or spuds, or a combination of these methods, depending upon the rise and fall of the tide, or the currents to be encountered. The form of framework depends largely upon the system used to feed the drills down, as the hole is cut into the rock. The height of the frame and the length of feed depend on the rise of tide and the depth of water over the rock and the depth to which the hole is to be drilled.

Various styles of mountings are employed in submarine excavation work. The drills used for such operations are generally of the heaviest type, as the work to be done is always severe and difficult. EDWARD F. SCHAEFER, M.M.E.,
Ingersoll-Rand Company, New York.

Rock Excavating Machinery. In quarrying the most important machines are the channeler, the gadder, rock drill, air compressor, etc. To meet the varying requirements of different classes of work four styles of track channelers are manufactured.

Upright Channeler.—This consists of a truck mounted on four flanged wheels running on a track. Upon this truck is carried a boiler, (in the steam driven machine) or a reheater (in the air driven channeler) together with a powerful chopping engine mounted at one side on a frame of great strength. At the end of the piston rod of this engine are connected cutting steels which are driven against the rock by steam or air power in the engine cylinder.

Swing Back Track Channelers.—In machines of this type, the frame carrying the cutting engine swings on a hinge joint, giving an angular adjustment up to 45 degrees from the vertical in the bare machine, or 15 degrees in the outfit carrying the boiler or reheater. In addition to this movement the cutting engine swings in the plane of the frame, with an angular range up to 45 degrees either side of the vertical.

Under Cutting Chambers consist of a heavy frame of cast iron mounted on four wheels, carried on steel axles running in babbitted boxes. At either end of the frame is a special guide shell provided with a swinging adjustment in both horizontal and vertical planes by means of which all angular conditions may be met, and cuts carried clear into the corners. The shells are hung very low, thus giving the least possible offset in cutting. The use of the two shells permits the channeler to work close to the wall and adapts the machine to deposits of any angle or dip.

The **bar channeler** consists of a carriage supporting the cutting engine mounted on two parallel bars along which it is moved automatically by means of a three cylinder engine actuating a traveling feet nut. The engine is automatically reversed at each end of the travel; or the stops may be set at any intermediate point.

The **quarry bar** consists essentially of the

ROCK FALLS—ROCK ISLAND

single bar mounted on four tripod legs, two on either end. On the bar is mounted a carriage which supports the drill and which may be moved along the bar by means of ratchet and pinion and operated by a hand wheel.

The *gadder* consists of a heavy solid cast iron body mounted on four wheels forming a truck running close to the floor of the quarry. To one end of the truck is hinged a standard or arm which can be swung from nearly horizontal to vertical and firmly locked in any desired position. On the swinging arm or standard is a sliding carriage on which may be mounted by means of a cone pivot and bolt, any one of several sizes of rock drills, according to the work to be done. To raise or lower the drill and move it along the slide a chain is attached to the saddle and run up and over a shaft at the end of the swinging arm and down to a small drum on which it is wound by turning a crank conveniently placed for the operator. A special taper gib or wedge clamp is fitted on the saddle, wherewith the saddle is firmly locked to the swinging arm by simply throwing down a small lever when the drill has been raised or lowered to the proper position. At each corner of the truck frame is a large pointed steel pin or pointer, slipping freely in a guide socket and when the machine is properly arranged a blow from a sledge on each of these pins anchors the truck in place.

See AIR COMPRESSORS; ROCK DRILLS; PUMPS, COMPRESSED AIR; PNEUMATIC TOOLS; MINING AND MILLING MACHINERY; COAL MINING MACHINERY; CRUSHING AND GRINDING MACHINERY; TOOLS AND TOOL-MAKING; ETC.

Rock Falls, Ill., city in Whiteside County; on Rock River and on the Chicago, Burlington & Quincy railroad; across the river from Sterling, where connection is made with the Chicago & Northwestern railroad; about 110 miles west of Chicago. It was settled in 1867 by Augustus P. Smith. It is the commercial and industrial centre of the eastern part of the county south of Rock River. The water power is good; the chief manufactures are wire fencing, rivets, agricultural implements, butter tubs, flour, furniture, wooden-ware, wagons, carriages, and dairy products. The number of employees is about 1,000. There are seven churches, a high school, elementary schools, and a public library. The government is vested in a mayor and a council of six members, who serve two years; three members are elected annually. Pop. (1910) 2,657.

Rock Fever. See MALTA FEVER.

Rock-fish, the name of several fishes usually found about reefs and on rocky bottom. In the United States the most prominent one is the striped or rock bass (see BASS); another is a grouper (*Epinephelus adscensionis*) of the West Indies, called by English-speaking fishermen "rock-hind." The name applies on the Pacific coast to the whole family *Scorpanidae*, represented in the Atlantic by the dory or rose-fish (*Sebastes marinus*), which looks somewhat like a perch in form, reaches a length of two feet, has a rosy hue, and is excellent for the table; it may be known by its nearly uniform orange-red color, and its spiny head. The genus *Sebastes* contains more than 50 species of

Pacific coast rockfish, and several are constantly brought to market. Says Jordan: "*Sebastes pouci spinus*, the bocaccio, large and swift, is abundant in California. *Sebastes flavus*, the yellow-tail rockfish, reaching a length of two feet, is one of the most valuable species. It is abundant from San Francisco to San Diego. *S. mystinus*, the black rockfish, is the most abundant species in rather shallow water about San Francisco. Another abundant species is the orange rockfish, *S. pinniger*, found from Puget Sound to San Diego. It reaches two feet in length, and is a common market fish; and the rasher (*S. miniatus*) is another important species, reaching a length of two feet and abundant from San Francisco to San Diego. The red rockfish (*S. ruberrimus*) is the largest species of all, reaching a length of 2½ feet; it is abundant from San Diego to Puget Sound, and is a valued food fish. Another important species is the yellow-backed rockfish (*S. maliger*), which is found from Monterey to Sitka. It is especially abundant northward, and reaches nearly two feet in length. The Spanish flag, *Sebastes rubrovinatus*, banded red and white, is perhaps the handsomest sea fish in our waters." Consult Jordan and Evermann, 'American Food and Game Fishes' (1902).

Rock Hind. See ROCK-FISH.

Rock-hopper, a rock wallaby or kangaroo (q.v.).

Rock Island, Ill., city, county-seat of Rock Island County; on the Mississippi River, and on the Chicago, R. I. & P., the Chicago, B. & Q., and the Chicago, M. & St. P. R.R.'s; 180 miles west by south of Chicago, opposite Davenport (q.v.), Iowa, a few miles below Moline (q.v.), and 125 miles, in direct line, north by west of Springfield, the State capital. The city is named after the island in the river between the cities of Rock Island and Davenport. The United States government and the Chicago, Rock Island & Pacific railroad built a combined railroad and highway bridge from Rock Island city to the island and thence to Davenport. The original cost of this bridge was \$1,000,000. Another bridge connects Moline with the island, thus making the three cities ("The Triplets") one in many matters commercial and industrial. Rock Island has steamer connections with all the Mississippi ports. The island is three miles long, composed largely of limestone. A government arsenal and armory are on the island. That portion of the river between the island and Davenport is navigable, but on the west side of the island the river has been dammed by the United States government, thus furnishing Rock Island, Moline, the island, and Milan (a few miles below the city) with extensive water-power, which has contributed to the development here of a large and important manufacturing centre. Rock Island has excellent transportation facilities which make it of importance as a commercial city.

The chief industrial establishments are the arsenal, in which there are 2,000 employees; plow factory, which has 800 employees; lumber mills, 1,000 employees; railroad employees 500; brewery, 150 employees; oil-cloth factory, 150 employees, and a number of smaller industries which give employment to some hundreds of persons. The prominent public buildings are the

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government arsenal, with \$10,000,000 of improvements; the court-house, which cost \$175,000; the high school, \$125,000; the library, \$75,000; Saint Anthony's Hospital; the 20 churches, and a number of fine business blocks. The Davenport mansion, on the island, is of historic interest. The educational institutions are Augustana College (Lutheran), opened in 1860, Villa de Chantal (Sisters of the Visitation), public and parish schools, several private schools, one city library, and three school libraries. The five banks have a combined capital of \$400,000. The government is conducted on the commission plan, Little Rock being (1911) one of 17 cities of this state so governed.

Rock Island was settled in 1826 by Colonel George Davenport. It was platted in 1835, and called Stephenson. In 1841 it was united with Farnhamburgh under its present name, and in 1849 was chartered as a city. When Colonel Davenport built his home on the island, in 1833, the neighboring places were a fort and an Indian trading post. Prior to his settling in this locality, in 1826, he had been there in 1816 with the government troops, when Fort Armstrong was established. Black Hawk, the Indian chief, often visited him here, and many of the people who are now regarded as "history makers" often visited Davenport in his island home. During the Civil War, the prison here was the place of detention of many Confederate prisoners. When the Mississippi Valley began to change from a raw producing region to a section sending to the world the finished and polished product of the best in manufacturing methods, Rock Island was among the leading cities which were quick to welcome the railroad and the manufactory, and the first to use the improved means presented to extend the commerce of the city. Pop. (1880) 11,659; (1890) 13,634; (1900) 19,493; (1910) 24,335.

H. P. SIMPSON,
Editor 'Rock Island Argus.'

Rock Kangaroo or Wallaby. See KANGAROO.

Rock-melon. See MELONS.

Rock Ptarmigan. See PTARMIGAN.

Rock-rabbit. See HYRAX.

Rock Rapids, Iowa, town, county-seat of Lyon County; on the Rock River, and on the Illinois C., the Burlington, C. R. & N., and the Chicago, St. P., M. & O. R.R.'s; about 58 miles north of Sioux City. It is in an agricultural and stock-raising region. It has considerable manufacturing interests connected chiefly with farm and dairy products. It is the commercial centre of a large part of the county. Pop. (1910) 2,000.

Rock River rises in the State of Wisconsin, 50 miles west of Lake Michigan; it flows south-southwest, receives several tributaries, enters Illinois, and crossing the State in a south-westerly direction, flows into the Mississippi a little below Rock Island. Its whole length is estimated at 330 miles, about 225 of which have been ascended by small steamers, though with some difficulty, owing to the various rapids. The region which it drains is one of great fertility.

Rock-roses. See CISTUS.

Rock Salt. See SALT.

Rock-snake, a name among English colonists for pythons generally; especially for *Python regius* of southeast Africa, which sometimes grows to a length of 15 feet.

Rock-soap, a hydrated silicate of aluminum, containing peroxide of iron and water. It is a variety of halloysite, is found only massive, is earthy, easily broken, black or nearly so, very soft, somewhat greasy to the touch, and adheres strongly to the tongue. Rock-soap is used for crayons, and is also useful, by reason of its saponaceous properties, in the washing of cloths, etc.

Rock Springs, Wyo., in Sweetwater County; on Bitter Creek, and on the Union Pacific railroad; about 250 miles west of Laramie. It is on a plateau, in a mountainous region in which there are extensive coal fields. The principal industries are connected with the mining and shipping coal. There are two banks, which have a combined capital of \$125,000. The educational institutions are a public high school, public and parish elementary schools, and a high school library. Pop. (1880) 763; (1890) 3,406; (1900) 4,363; (1910) 5,778.

Rock-temples. In many parts of western India, as at Ellora, Elephanta, Karli, and Salsette Island, natural rocks have been cut into temples; as also into caves and forts. Out of India well-known instances of the same kind occur at Petra, in the Arabian Desert, at Abu-Simbel, in Egypt, and in China and Siam. See also CAVE-DWELLERS.

Rock-trout, a valuable fish (*Hexagrammus decagrammus*) of the coast of California and northward. It is one of the greenlings (q.v.), and is known northward as boregat and bodieron. It reaches a length of 18 inches, and is regarded as an excellent food-fish.

Rock-work. See MASONRY.

Rock-wren, a grayish-brown migratory wren (*Salpinctes obsoletus*) of the Rocky Mountain region which haunts the mountain gulches and makes a big rough nest in some rift of rock, or on a ledge. It has a charming song, and is likely to come familiarly about the mountaineer's cabin. Consult Coues, 'Birds of the Southwest' (1878).

Rock'all Islet, in the North Atlantic Ocean, 160 miles west of Saint Kilda, 260 miles north of Ireland, and 290 miles west of the mainland of Scotland, is an isolated conical rock of stratified granite, 100 yards in circumference, rising 70 feet above the sea, from a sandbank about 50 miles long and 25 miles broad. The vicinity is a cod-fishing ground for Scotch and English fishermen. The first known landing was made in 1810, and the islet was the object of a scientific expedition in 1896.

Rockefeller, rök'e-fäl-er, John Davison, American capitalist: b. Richford, Tioga County, N. Y., 8 July 1839. After an education in the public schools of Cleveland, he there entered a mercantile establishment as clerk, and subsequently was made cashier and bookkeeper. In 1858 he became a member of the firm of Clark & Rockefeller, and in 1860 the concern entered the oil business as Andrews, Clark & Company. The firm, its style having been changed to William Rockefeller & Company, built the

ROCKEFELLER—ROCKEFELLER FOUNDATION

Standard oil works at Cleveland in 1865, and in 1867 the various interests with which John and his brother William were connected were consolidated into one corporation. In 1870 the Standard Oil Company was incorporated, with John Rockefeller as president. Increasing business led to the formation in 1881 of the Standard oil trust, which, however, was dissolved in 1892. Since that time Rockefeller has continued in control of the various separate companies in which he is the principal stockholder. His chief gifts have been to the University of Chicago; these, unconditional and conditional, aggregating more than \$20,000,000. He presented also to Cleveland real estate and cash to the value of \$600,000; to Vassar College a \$100,000 building and 3,000 volumes on Greek art and literature; to Tarrytown, N. Y., \$50,000 for a high-service water tower; to the American Baptist Missionary Union, \$400,000; and to Barnard College, \$1,375,000; to the General Education Board (total) \$43,000,000; etc.

Rockefeller, John Davison, Jr., capitalist: b. in 1877. He was graduated from Brown University in 1897, and has since been associated with his father in business enterprises; is also interested in philanthropic and church work.

Rockefeller, William, capitalist: b. Richford, N. Y., 31 May 1841. After schooling at Owego, N. Y. and Cleveland, O., he became a bookkeeper and afterward a partner in a produce commission business. He became associated with his brother, John D. Rockefeller when the latter became established in the oil business, and since 1865, William Rockefeller has been at the head of the business in New York, and is (1910) president of the Standard Oil Co. He is vice-president of the Standard Oil Co. of New Jersey, trustee of the Anaconda Copper Mining Co., the Consolidated Gas Co., and the United States Trust Co. On the board of directors of many railroads, among others the New York Central and Hudson River R. R. Co., the Lake Shore and Michigan Southern Ry. Co., the New York, New Haven and Hartford R. R. Co., the Chicago, Milwaukee and St. Paul Ry. Co., and the D. L. and W. R. R. Co.; is also director of Amalgamated Copper Co., the Poughkeepsie Bridge R. R. Co., the National City Bank, the Hanover National Bank, the National Transit Co., the New York Mutual Gas Light Co., the Brooklyn Union Gas Co., and many others.

Rockefeller, William Goodsell, capitalist: b. 1870. After graduation from Yale, in 1892, he was made treasurer of the Standard Oil Co., of New York, and has been elected director in the Brooklyn Union Gas Co., the Lincoln National Bank, the Columbia Bank and other financial institutions.

Rockefeller Foundation. In March 1910 Mr. John D. Rockefeller set on foot a scheme to distribute a large amount of his wealth; for the avowed purpose of uplifting humanity all over the world, by organizing his philanthropic work through the United States Government. At his request Senator Gallinger introduced a bill in the Senate creating the "Rockefeller Foundation," which in the language of the bill, was "to promote the well-being and advance the civilization of the peoples of the United States and its territories and possessions, and of foreign lands, in the acquisition and dis-

semination of knowledge, in the prevention of suffering, and in the promotion of any and all the elements of human progress." It was generally understood at that time that Mr. Rockefeller intended to limit his gifts of money thereafter to this Foundation, but such has not proved to be the case. His son, John D. Rockefeller, Jr., who was named as one of the incorporators of the project, announced that he intended to devote his life to the management of the Foundation.

The bill was severely criticised by Hon. John Bigelow, by Edward T. Divine, by President Jacob Gould Schurman of Cornell, and by many others. In an address before the National Association of State Universities, on 15 November, President Schurman said:

"Under the terms of this proposed board charter, there is scarcely anything which concerns the life and work of individuals and nations in which the Rockefeller Foundation would not be authorized to participate. As the safety of the State is the supreme condition of national civilization, the Foundation might in time of war use its income or its entire principal for the defense of the republic. In time of peace it might use its funds to effect economic and political reforms which the trustees deemed essential to the vitality and efficiency of the republic. The Foundation might become the champion of free trade or protection, of trusts or of the competing concerns out of which they grow, of socialism or individualism, of the programme of the Republican party or the programme of the Democratic party.

"It might endow the clergy of all religious denominations or it might subsidize any existing or any new religious denomination. Tomorrow it might be the champion of the Christian religion and 100 years hence furnish an endowment for the introduction of Buddhism into the United States. It might build tenement houses for the poor in New York city or carry the results of sciences to enrich the exhausted soils of the East or the arid tracts of the West. It might set up an art gallery in every city of the United States or endow universities which would rival the great universities of the West.

"These may be likely objects for the application of the funds of the Rockefeller Foundation. I am not, however, attempting to forecast its work, but to understand its charter. And as far as I can see the proposed charter would authorize all of these and a multitude of similar activities.

"Although these are large powers I for one should have no hesitation in entrusting Mr. Rockefeller with them. The experience we have had of his philanthropy shows that he would use them wisely. Vast and comprehensive, therefore, as the scope of this Foundation is, I would not in any way limit or restrict it so long as it was in charge of Mr. Rockefeller or even of his son and his expert coadjutors.

"After they have passed away, however, the situation would be entirely changed. We know nothing about the kind of man who may succeed him, and the objects of the Foundation remaining as important and comprehensive as they are I am decidedly of the opinion that the public should have a right to a voice in the selection of the board after Mr. Rockefeller's direct influence has passed away."

ROCKEFELLER FOUNDATION

Doctor Schurman said that self-perpetuating boards were practically things of the past in all large institutions and that almost no college or university of to-day is governed entirely by a board so selected. He added: "The plan of a self-perpetuating board for the Rockefeller Foundation is at once contrary to the general practice of our great universities, and, as it seems to me, contrary to the spirit of our age and of our country. A self-perpetuating and irresponsible board wielding enormous powers is from the point of view of efficiency a blunder, and from the point of view of democracy an anomaly, if not indeed a defiance."

Doctor Schurman favored a governing board selected somewhat as in the case of the Smithsonian Institution, which is conducted by a board of regents composed of the Vice-President, the Chief Justice of the United States, three members of the Senate and three members of the House, together with six other persons other than members of Congress, two of whom shall be residents in Washington, and the other four inhabitants of some State, but no two of the same State.

The objection was urged against the bill by the charitable organ *The Survey*, that it would place great resources indefinitely at "the uncontrolled disposal" of a small group of men. Doctor Divine, editor of *The Survey* suggested three amendments as safeguards against abuse. The first was: "The Government should have a voice—naturally by the election of Congress or appointment of the President—in the selection of trustees." His second point was: "It should be stipulated that the annual income during the life of the endowment should actually be expended for the purposes enumerated in the charter, the indefinite increase of the endowments through compound interest being forbidden. His third point was: "That within a specified period, which might properly be 100 years or more, any given endowment should be entirely expended, both principal and interest."

On 12 December, Senator Gallinger introduced a bill providing for various amendments to the proposed charter for the Rockefeller Foundation, to meet the objections that had been raised against it. The total amount of property to be held at one time was limited to \$100,000,000, exclusive of increases in value subsequent to its receipt. To prevent the accumulation by the board of trustees of vast wealth under the charter it was provided that the income from the funds should not be accumulated, but must be expended as soon as a wise administration of the act would permit. Congress was given the power to place limitations upon the use of the fund or property at any time in the future as Congress may deem best for the public interest. Notice of the election of a new member to fill a vacancy in the corporation was required to be sent to the President of the United States, the Chief Justice of the Supreme Court, the President of the Senate, the Speaker of the House, and the presidents of Harvard, Yale, Columbia, Johns Hopkins, and the University of Chicago. The election was to be void if disapproved by a majority of these referees, and it was to become effective when approved by a majority after 60 days. It was also proposed in the amendments

that Congress "may at any time impose such limitations upon the objects of the corporation as it may deem the public interest demands" and that any and all gifts and bequests of property "shall be received and held subject to the terms of this proviso and to the terms and limitations which may be imposed by any act of Congress hereafter passed." In effect, Mr. Rockefeller proposed to give into the absolute control of the United States for philanthropic purposes the bulk of his great fortune.

Rockefeller Institute for Medical Research. This institution was incorporated 14 June 1901, with Dr. William H. Welch, of Baltimore, president; Dr. T. Mitchell Prudden, of New York; Dr. Christian A. Hester (since died in 1910); Dr. Theobald Smith, of Boston; Dr. Hermann M. Briggs, of New York; Dr. Simon Flexner and Dr. L. Emmett Holt, of New York (secretary and treasurer); for a board of scientific directors. Mr. Rockefeller pledged \$200,000 to the board to be drawn upon at their discretion during a period of 10 years, for preliminary work, his letter of gift expressing his desire "to accomplish the most for humanity and science." Scholarships and fellowships were created and distributed to the existing laboratories throughout the country, to enlist the cooperation of various investigators, to aid some promising lines of research which could not previously be continued for lack of funds, and to discover who and where were the persons who desired to undertake research work and what were their qualifications. At the end of the first year it was decided to centralize the most important lines of work in the Institute's own laboratory under a competent head, and with special equipment. Mr. Rockefeller gave \$1,000,000 at the second annual meeting of the board in June 1902 for this object. The Schermerhorn property, fronting East River at East 66th and 67th streets, New York, was chosen for the site, and a plot comprising 26½ city lots, upon which the present building stands, was deeded to the Institute. Dr. Simon Flexner resigned his position as professor of pathology in the University of Pennsylvania to become director of the Institute and began his work 1 July 1903. The cornerstone of the building was laid 3 Dec. 1904, a building at the corner of Lexington avenue and 50th street being used temporarily.

The present organization provides for the following departments: pathology, bacteriology, physiological and pathological chemistry, physiology, comparative zoology, pharmacology, and experimental therapeutics.

The purpose of the Institute is research, not instruction; yet it exerts a considerable influence on medical education. Upon the basic sciences above mentioned the future discoveries on medical science must largely rest. The Institute endeavors to apply the latest discoveries in science to problems connected with the prevention and cure of disease.

The Institute has cooperated with the Health Department of New York in the study of conditions surrounding the production and distribution of the milk supply of the city, and the effects of milk upon the health of children in the tenements; also with the commission appointed by the city in 1904, to study the prevalence of the acute respiratory diseases, and

ROCKET — ROCKHILL

with that appointed in 1905 to investigate cerebro-spinal meningitis. It has united with Harvard University in sending men to Manila to study certain phases of smallpox; and it has made grants each year to assist important investigations which were being carried on in various places.

The work done by the Institute is published in various scientific journals and collected in volumes of 'Reprints.' In Feb. 1905 the Institute took charge of the publication of *The Journal of Experimental Medicine*.

Mr. Rockefeller gave an additional \$3,820,000 when the hospital of the Institute was opened on 7 Oct. 1910. This made the income bearing endowment \$6,420,000, and the total endowment including grounds and buildings \$8,240,000. In the hospital the closest scientific study is given to obscure pathological conditions such as heart disease, pneumonia and infantile paralysis. The board of trustees of the Institute consists of John D. Rockefeller, Jr., Frederick T. Gates, William H. Welch, Starr J. Murphy, and Simon Flexner.

Rocket, the name of several plants; one salad plant, chiefly used by Italians, is the *Brassica eruca*; the yellow rocket is the common winter cress, *Barbarea vulgaris*; but the sweet or dame's rocket is the most widely known. It is a tall perennial, with purplish or white single flowers in a loose raceme, and fragrant at night, much used in old-fashioned gardens.

Rockets. See PROJECTILES.

Rockford, rŏk'fŏrd, Ill., city, county-seat of Winnebago County; on the Rock River, and on the Chicago & N. W., the Chicago, M. & St. P., Chicago, B. & Q., and the Illinois Central R.R.'s; 81 miles northwest of Chicago. It was settled in 1834, being the first settlement in the county; and was incorporated as a city in 1853. In 1890, it obtained a considerable increase of territory by annexation. It is built on both sides of the river, which is here crossed by three railroad and three highway bridges. A dam 800 feet long across the river secures excellent water power for manufacturing, and the city is one of the most important industrial centres of northern Illinois. The chief manufactures are agricultural implements and furniture; others are pumps, watches, silver-plated ware, knitting wool, paper, flour, and grape sugar. According to the census of 1900 the manufacturing establishments numbered 450, with a capital of \$14,126,834; in 1904 the number of employees was about 13,000. There are six banks with a combined capital of \$650,000, doing an annual business to the amount of \$22,969,727.53 (clearing-house, 1903). Rockford is surrounded by a fertile agricultural region, and with its railroad facilities is an important shipping point for the products of this district. The city is well built with wide regular streets; among its notable public buildings are the Memorial Hall for Soldiers, the city-hall, the court-house, two hospitals and the public library; the library contains over 20,000 volumes. The public school system is of the best, and includes a high school, organized in 1857; there is also a Roman Catholic parish school; and the city is the seat of Rockford College (for women) and of Brown's Rockford Business College. The government is

vested in a mayor and a council of 15, elected biennially; the council has the power of appointing the city officers. There is an excellent water supply from five artesian wells, and the waterworks are owned and operated by the municipality. Pop. (1900) 31,051; (1910) 45,401. Consult C. A. Church, 'History of Rockford and Winnebago County, Illinois' (1900).

J. STANLEY BROWNE,
Editor 'Morning Star.'

Rockford College, a college for women, located at Rockford, Ill. It was founded in 1849 as a seminary, and received its college charter in 1892. It has a collegiate department, department of music, and preparatory department; the collegiate work is in two courses, classical and general scientific, for the completion of which the degrees of A.B. and B.S. are conferred. In 1910 the ground and buildings were valued at \$150,000; the productive funds amounted to \$147,000, and the annual income to \$61,000. In 1910 the students numbered 174, and the instructors 27.

Rockhampton, rŏk-hămp'ton, Australia, capital of the county of Livingstone, Queensland, on the Fitzroy River, about 420 miles by rail northwest of Brisbane, almost on the Tropic of Capricorn. It is enclosed by hills, and is the gateway to rich pasture lands, and the adjacent Mount Morgan mineral fields. It has considerable river traffic with the ports of Alma and Broadmount at the mouth of the river, 35 miles distant.

Rock'hill, William Woodville, American diplomatist: b. Philadelphia 1 April 1854. He was educated at the Lycée Bonaparte and the Collège de France, Paris, and was graduated from the military school of Saint Cyr in 1871. He served with a French regiment in Algeria but returned to the United States in 1876. In 1881 he returned to France and resumed his oriental studies begun during his college course, and in 1884 entered the diplomatic service as 2d secretary of legation at Peking, China. He was *chargé d'affaires* at Seoul, Korea, 1887-8; visited China, Mongolia and Tibet during 1888-92 on exploring tours; was appointed chief clerk of the State Department in 1893; was made 3d assistant secretary of state a year later; and 1st assistant in 1896. He was minister to Greece, Rumania and Servia, 1897-9, and the following year went as United States commissioner to China, where in 1901, under appointment as special ambassador, he signed the final peace negotiation. In October 1901 he resumed his duties as director of the Bureau of American Republics to which he was appointed in 1890. He has published 'Udanavarga, the Northern Buddhist' (1883); 'A Life of Buddha, and the Early History of his Church' (1884); 'Land of the Lamas' (1891); 'Diary of a Journey in Mongolia and Thibet' (1893).

Rockhill, S. C., town in York County; on the Southern and the South Carolina & G. E. R.R.'s; about 25 miles south-southwest of Charlotte, N. C. It is in a fertile agricultural region in which cotton is one of the principal products. The principal industries are connected with cotton and farm products and lumber. The Winthrop Normal College, with about 500 students, is located here. The banks

ROCKING STONE—ROCKLAND

have a combined capital of \$150,000. Pop. (1910) 7,216.

Rocking Stone, or **Loggan-stone**, a block of stone, or a mass of rock, often of great size and weight, so nicely poised on a lower mass that it can be moved backward and forward with but little force. Some rocking stones are evidently artificial, others natural. The former appear to have been contrived by cutting out a mass of rock round the centre-point of the base of the block. The latter are generally granitic rocks, in which porphyry and feldspar are abundantly found. These ingredients being rapidly decomposed, and the sand and dust swept away by wind and rain, what was originally a solid rock becomes a group of pillars of irregular shape, separated by horizontal and vertical fissures. Gradually the edges of the block forming the pillar decay, and it assumes the appearance of two or more spheroidal rocks, one resting on the other. When the upper mass is so situated as to preserve its equilibrium notwithstanding the gradual wearing away of the base, a rocking stone is the result. Rocking stones occur in nearly all countries. In Great Britain they are found in Cornwall, Derbyshire, Lancashire, Yorkshire, and Wales, in the shires of Perth and Kirkcudbright, Scotland, and also in many places in Ireland. Much larger than any of these, however, is the rocking stone of Tandil in Argentina, 250 miles south of Buenos Ayres, which weighs over 700 tons, yet is so poised that it rocks in the wind and may be made to crack a walnut. Rocking stones are supposed to have been employed in ancient times for purposes of divination, the favorable or unfavorable oracle being determined by the number of vibrations. Consult Vincent, 'Around and About South America' (1890).

Rockingham, rōk'ing-ām, **Charles Watson-Wentworth**, MARQUIS OF, English statesman: b. 13 May 1730; d. 1 July 1782. He was educated at Westminster School and Saint John's College, Cambridge, and in 1750 was created an Irish peer under the titles of Baron and Earl of Malton, later in the same year becoming also an English peer and Marquis of Rockingham by succession. He took his seat in the House of Lords in the following year and continued in practice with his Whig sympathies which he had inherited from his father. He took little part in politics, being a hesitating speaker and of mediocre talent, until 1765 when on the refusal of Pitt to take office, he became prime minister. His large wealth and powerful family position contributed to his elevation, and he had the invaluable assistance of his brilliant secretary, Edmund Burke. He took a friendly attitude toward the American colonies and favored the repeal of the Stamp Act, though he affirmed the right of Parliament to tax the colonies. He gave offense to the king for his support of the repeal principle and for refusal of allowances to the king's brothers, and was superseded by Pitt who returned to form a new ministry. His tenure lasted barely a year and his parliamentary career was inconspicuous until March 1782 when upon the fall of North's administration he was called upon to form a coalition ministry in which he held the treasury. The chief

events of his second term were the concession of legislative independence to Ireland, and the forcing the king to treat for peace with the United States on the basis of their independence. In accomplishing these ends credit is not given to Rockingham for enlightened statesmanship but rather for the adoption of a policy of opportunism. Consult Albemarle, 'Memoirs of Rockingham' (1852-3).

Rockland, Maine, city, and county-seat of Knox County. Set off from Thomaston in 1848, and incorporated a city in 1854. On a harbor which is an easterly extension of Penobscot Bay at its mouth; is very commodious and easily accessible; is naturally protected from storms coming from any direction except from the northeast and against these by a breakwater a little more than four-fifths of a mile long extending from the northern shore, and is marked by two lights, a revolving one at the extremity of the breakwater and a fixed one at Owl's Head, the promontory in which its southerly shore ends. The breakwater was begun by the U. S. Government in 1881, and practically completed in 1902. It cost about \$500,000. Rockland is connected with Maine Central R. R. system; 86 miles by rail from Portland; has steamboat connection with Boston, Bangor and Portland, and with all the important coast and island towns of eastern Maine as far east as Machias, a steamer running every day to and from Bar Harbor during most of the year. It is the centre and managing point of the Rockland, Thomaston & Camden Street Railway system, which has 21 miles of track extending northward to Rockport and Camden, and westward to Thomaston and Warren, and other electric railways. The region thus connected accommodates many summer tourists and visitors. Many wealthy people have built summer cottages at Camden, which place is especially notable for its combination of coast and mountain scenery. Within its limits are several mountain peaks varying in height from 1,000 to 1,500 feet. Mt. Battie is close to Camden Village and very near the shore, and Mt. Megunticook, a loftier peak, extends along the shore further north. Along the inner side of these two mountains a road has been cut, which extends along the shore of a large lake, and affords some grand and beautiful scenery. The lake furnishes water power for extensive manufactories, the water being used five times in the descent of little more than two miles from the lake to where it flows into the salt water at Camden Harbor. Norumbega, a fine stone house built by the late J. B. Stearns, the inventor of the duplex telegraph, is one of the handsomest private residences ever constructed in Maine.

Industries.—Shipbuilding has been for many years an important industry in this section, and fine vessels are constructed at Thomaston, Rockland, Rockport and Camden. A large part of the accumulated wealth has been derived from the building and operation of vessels. The *Red Jacket*, a clipper ship built at Rockland in 1853, is said to have made the passage across the Atlantic Ocean in a shorter time than it was ever made by any other sailing vessel. The principal industry of Rockland from a period that goes well back toward its settlement has

seen the manufacture of lime. This is also carried on at Rockport and Thomaston. The Rockland limestone has a higher percentage of calcium than any other considerable deposit in the country, and is reputed in the building market to make the strongest mortar. The quality and quantity have been materially improved by the introduction of patent kilns, in 1850, and the more recent introduction of coal as fuel. In 1890 a steam railroad was constructed to transport the stone from the quarries in the rear of the town to the kilns on the water front. Formerly in the hands of independent operators, the industry passed over to the Rockland-Rockport Lime Co., which now controls the railroad and about three-fourths of the product. The company also operates a large factory for the manufacture of hydrated lime. The shipments to New York and other points are largely made in barges towed by tugs. The granite business is important. Two of the largest granite companies of the country have quarries in the vicinity, on the islands and on the mainland. These companies have handled some of the largest stones that have ever been wrought. The United States custom house in St. Louis, the postoffices in New York and Cincinnati, and many of the largest and handsomest buildings in the country have been built of Rockland granite. Steam and gasoline engines and blacksmiths' and granite workers' tools are manufactured. Fishing is carried on to some extent. Clams and sardines are canned, and more than 2,000,000 pounds of lobsters are shipped annually from here by rail. It is an important distributing point to the towns of eastern Maine.

The public buildings are the U. S. custom house and postoffice building, which is a handsome granite structure and cost about \$150,000, and the County court house and jail, which are of brick with granite trimmings and are on the same lot. The two cost something more than \$100,000. There are many handsome residences with fine grounds. In one of the cemeteries is a statue of white Italian marble of General Hiram G. Berry, who was a citizen of Rockland, and was killed at the Battle of Chancellorsville. It is the work of Franklin Simmons. Pop. (1910) 8,174.

LEWIS FREDERICK STARRETT.

Rockland, Mass., town in Plymouth County; on the New York, New Haven and Hartford railway; about 17 miles south by east of Boston. Until its incorporation as a separate town in 1874, it was a part of the town of Abington of the old Plymouth Colony. The town is pleasantly situated and its proximity to Boston and the convenience of transportation, give it an excellent trade and have made it a popular suburb of that city.

Rockland is a manufacturing place of growing importance. The census of 1900 returned 81 establishments with a combined capital of \$998,824, employing 1,071 persons at \$515,974 in annual wages. They used \$1,363,959 in materials and had a product valued at \$2,288,972. The industry first in importance was the manufacture of boots and shoes. Tacks are also extensively manufactured; and other factories

produce heels and shoe findings, box board, shoe boxes, and soaps.

Rockland has well-built factory and public buildings, churches, schools, and attractive homes. It has two banks, a public library, and weekly newspapers. Pop. (1890) 5,213; (1900) 8,150; (1910) 6,928.

Rockland, N. Y., a county in the southeastern part, bordering on New Jersey, and bounded on the east by the broadened expanse of the Hudson River known as the Tappan Zee and Haverstraw Bay. Nyack (q.v.), its largest town, is about 30 miles from New York, and in the vicinity, which is near the northern end of the Palisades of the Hudson and rugged and picturesque, are many handsome estates of New York business men. The county-seat is New City. The county is served by the New York, L. E. & W., the New Jersey & N. Y., and the West Shore R.R.'s; and while in many parts the soil is rocky, has, particularly in the eastern part, rich farms and large dairy interests. In the western section are the Ramapo Mountains, which contain the sources of the Ramapo and Hackensack Rivers. Granite, gneiss, limestone, trap, and red sandstone are extensively quarried, the last a good building-stone; the brick manufacturing is important; and large quantities of fruit, green vegetables, butter, and milk are shipped daily to New York. Many of the farmers "take boarders" during the summer months, and its healthfulness and its proximity to the city make Rockland County a popular vacation resort.

Rockland Lake, N. Y., a village of Rockland County, on the West Shore Railway, and on the Hudson River; four miles above Nyack and 30 miles above New York. It has only a small permanent population but is a popular vacation resort. Near here is Rockland Lake, a large sheet of clear, fresh water, from which 300,000 tons of ice are taken annually for use in New York.

Rockling, a European fish of the cod family and of the genus *Motella*, three species of which are regarded as valuable in British markets.

Rockport, rôk'pôrt, Ind., city, county-seat of Spencer County; on the Ohio River; and on the Louisville, E. & St. L. railroad; about 100 miles southwest of Louisville, Ky., and 30 miles in direct line east by south of Evansville. It has steamer connections with all the river ports. It is on a bluff about 100 feet above high water. It is in an agricultural region in which grain and tobacco are the chief productions. The city has considerable manufacturing interests; the principal industrial establishments are flour and grist mills, foundry, machine shops, tobacco stemmeries, brick works, basket factories, creamery, wagon and carriage works, and furniture factories. It has a library founded in 1855. Pop. (1890) 2,314; (1900) 2,882; (1910) 2,736.

Rockport, Mass., town in Essex County; on the Atlantic Ocean, and on the Boston & M. railroad; about 30 miles northeast of Boston.

ROCKPORT → ROCKS

It is on an island, the same on which Gloucester (q.v.) is located. The town embraces several villages. Electric lines connect Rockport and Gloucester and many points on the island. It was settled in 1690 by Richard Tarr and was known at first by the name "Sandy Bay." It is a famous summer resort; near Pigeon Cove, one of the villages, are a number of summer cottages. Part of the land is fertile, and is used mainly for market gardening. Some of the places of interest in the vicinity are Dogtown Commons, where in the last of the 18th century a hundred families exiled themselves and lived in loneliness and poverty on those boulder strewn hills. Their numerous dogs gave the place its name. Other places of interest are Doctor's Run, The Headlands, and the Straitsmouth Life Saving Station at Gap Cove. In the northeastern part of the town are extensive granite quarries. The Boston post-office is built of granite obtained from these quarries. The chief manufacturing establishment is an isinglass factory which employs about 1,000 persons. There is one national and one savings bank. There are 12 churches, and the educational institutions are a high school, grammar and primary schools, and a public library, opened in 1871. Pop. (1910) 4,211.

G. M. HASKINS.

Rockport, Texas, town, county-seat of Aransas County; on the Aransas Bay, an inlet of the Gulf of Mexico, and on the San Antonio & A. P. railroad; about 170 miles southwest of Galveston, and 135 miles south by east of San Antonio. It was settled in 1865 by Doughty and Mathis; was incorporated in 1865 and chartered as a city in 1871. It has steamer connections with all of the Gulf ports. It is on the peninsula, Live Oak Point; and the cool gulf breezes make it a popular summer resort. It has extensive fishing interests, especially oysters, and small game is plentiful in the vicinity. Rockport makes large shipments of hides, livestock, and fruit. There are five churches, a high school, elementary schools, and one national bank. The government is vested in a mayor and a board of aldermen, eight in number, who are elected biennially. Pop. (1900) 1,153; (1910) 1,297.

C. W. NEWMAN,
Editor 'Enterprise.'

Rocks. Regarded as a whole, the earth, so far as we can examine it first hand and thus know it intimately, consists of three envelopes: (1) an outer gaseous envelope called the atmosphere; (2) a middle aqueous envelope called the hydrosphere; (3) an inner solid envelope called the lithosphere. These envelopes, considered together, including the lithosphere to a depth of 10 miles below the sea-level, have been shown to consist quantitatively of the following elementary substances:

O	49.98%	Na	2.28%	P	0.09%
Si	25.36%	K	2.23%	Mn	0.07%
Al	7.26%	H	0.94%	S	0.04%
Fe	5.08%	Ti	0.30%	Ba	0.03%
Ca	3.51%	C	0.21%	N	0.02%
Mg	2.50%	Cl:Br	0.15%	Cr	0.01%

These 18 substances have been shown by F. W. Clarke (Bulletin 78 United States Geological Survey, pp. 34-43) to comprise the great bulk of the earth. The others, though outnumbering them three to one, can be ignored.

The above-named elements, so far as they enter into the composition of the lithosphere, rarely occur in the uncombined state, but are usually united chemically in different proportions to form those more or less definite chemical compounds called minerals (for example, quartz, SiO_2 ; calcite, $\text{CaO} \cdot \text{CO}_2$; olivine, $(\text{MgFe})_2\text{SiO}_4$); and minerals in turn are aggregated in various ways to form rocks. A rock may be defined as any accumulation or aggregation of one or more mineral species or substances, potential or actual, which constitutes a considerable component of the lithosphere; for example, granite, sandstone, limestone, clay, gravel, salt-beds. Although the crust of the earth or lithosphere has been shown to contain many hundreds of species of minerals, nevertheless the great bulk of it is composed of comparatively few species, and these have been termed the rock-forming minerals, in contradistinction to the great multitude of mineral species found more particularly in veins, and which, though of great importance economically, and of primary interest scientifically, are insignificant in amount when compared with the great mass of the more common minerals which go to make up a large portion of the earth. Thus gold, silver, platinum, the sulphide ores, and the minerals containing such rare substances as thorium, uranium, or radium, are negligible in quantity when compared with the mass of minerals composing the lithosphere.

The science or treatise of rocks, in its broadest scope, which considers them in all their relations, is called petrology or lithology, while the systematic and descriptive science of rocks, leading more particularly to their nomenclature, is called petrography. This distinction is implied in the etymology of the words. The latter term is used commonly in connection with the microscopic study of the igneous rocks.

Those minerals which are of especial importance as rock-formers can be grouped as follows:

GROUP I.

Quartz.—This group, for present purposes, may be limited to a single species, quartz, which is one of the most abundant of minerals, and is remarkable otherwise for its rather superior hardness, lack of cleavage, and indestructibility. It has strong crystallizing powers and, where allowed to grow intact, forms those beautiful hexagonal crystals with which all are familiar. Chemically it is an oxide of silicon, SiO_2 , that most abundant of all acid radicals, which, when combined with the bases alumina, lime, iron, magnesia, and the alkalis, soda and potash, in different ways, forms that most important of all classes of mineral substances, the silicates.

GROUP II.

Feldspars.—These are the most abundant of all rock-formers. They comprise a rather complex group of silicates, where alumina, the alkalis, potash and soda, and the alkaline, earth-lime, are the bases. On a chemical and crystallographic basis they fall naturally into two series, the orthoclase and the plagioclase. Orthoclase, so called because of the rectangular cleavages lying parallel to the ortho- and clinopinacoids, is the type-species of the series. It is a silicate of potash and alumina having the chemical composition KAlSi_3O_8 , and is otherwise

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known as potash feldspar. It belongs to the monoclinic system of crystallization, and is further known as the monoclinic feldspar. A part of the potash of orthoclase may be replaced by soda. In fact most of the analyses of the mineral show one per cent or more of the substance. This replacement of potash by soda can take place until these two constituents are present in nearly equal proportions without altering the monoclinic character of the species. Such an orthoclase is called soda-orthoclase. Soda-orthoclase has a chemical composition represented by the formula $(\text{Na}, \text{K})\text{AlSi}_3\text{O}_8$, where soda predominates over potash. Under the microscope and between crossed nicols it exhibits a peculiar patchy appearance easily recognized.

Microcline, like soda-orthoclase, contains both potash and soda, $(\text{K}, \text{Na})\text{AlSi}_3\text{O}_8$. It is, however, triclinic, but only slightly so, as the cleavage angle between the pinacoids varies but slightly from 90° ($89^\circ 30'$), hence the name. Between crossed nicols it exhibits a peculiar cross-hatching, due to multiple twinning according to both the pericline and albite laws, and is thus usually easily distinguished under the microscope. It stands at the head of the true plagioclase series, but inasmuch as it possesses a notable amount of potash, it may be classified with soda-orthoclase as representing the transition varieties of feldspar, lying between the monoclinic, potash, orthoclase series and the triclinic, soda-lime, plagioclase series.

The more typical plagioclases are represented by albite, oligoclase, andesine, labradorite, bytownite, and anorthite, which together constitute the albite-anorthite series. The theory of their constitution was propounded by Tschermark in 1864. He showed that the series can best be explained as a mixture of two extreme molecules, the one a pure soda-alumina silicate molecule, and the other a lime-alumina silicate molecule, found in anorthite. The intermediate varieties can be considered as varying mixtures of these two molecules. Representing the albite molecule by Ab and the anorthite molecule by An, the series is expressed thus:

Albite	$\text{Ab}(\text{NaAlSi}_3\text{O}_8)$
Oligoclase	Ab_9An_1 to Ab_5An_5
Andesine	Ab_8An_2 to Ab_4An_6
Labradorite	Ab_7An_3 to Ab_3An_7
Bytownite	Ab_1An_9 to Ab_5An_5
Anorthite	$\text{An}(\text{CaAl}_2\text{Si}_2\text{O}_8)$

This series of mineral varieties furnishes one of the best illustrations of an isomorphous mixture. It constitutes the albite-anorthite or soda-lime series of plagioclase feldspars, all of which are distinctly triclinic. The cleavage angle in this series varies from $93^\circ 31'$ in labradorite to $94^\circ 5'$ in albite.

Usually the plagioclase feldspars can be quickly and surely distinguished from the microcline or the orthoclase varieties by their characteristic multiple twinning, which is manifested in thin sections between crossed nicols by a distinct parallel banding that traverses the individual mineral plates. It thus becomes a comparatively simple matter, with thin sections under the microscope and between crossed nicols, to distinguish between orthoclase, which normally shows plain non-striated plates, soda-orthoclase, which has a peculiar patchy appear-

ance, microcline with its more or less indistinct cross-hatching, and plagioclase with its characteristic, sharply defined, parallel banding. Furthermore, the different varieties of the plagioclase series can be identified by their behavior in polarized light, more particularly by the variation in their extinction angles. In a general way this angle may be said to increase in size in passing from the albite toward the anorthite end of the series.

The feldspars are not only of primary importance as rock-formers, but the classification of rocks as at present accepted (more particularly the igneous varieties) depends largely upon the kind of feldspar which they contain.

The feldspars can be grouped in tabular form thus:

(a) Monoclinic		Cleavage angle
Orthoclase (sanidine)	KAlSi_3O_8	90°
Soda-orthoclase	$(\text{Na}, \text{K})\text{AlSi}_3\text{O}_8$	$90^\circ (?)$
(b) Triclinic		
Microcline	$(\text{K}, \text{Na})\text{AlSi}_3\text{O}_8$	$90^\circ 30'$
Soda-microcline	$(\text{Na}, \text{K})\text{AlSi}_3\text{O}_8$	$90^\circ 30'$
Albite	$\text{NaAlSi}_3\text{O}_8 = \text{Ab}$	94°
Oligoclase		$93^\circ 4'$
Andesine		$93^\circ 23'$
Labradorite		$93^\circ 31'$
Bytownite		
Anorthite	$\text{CaAl}_2\text{Si}_2\text{O}_8 = \text{An}$	$93^\circ 13'$

Crystallizing as they do in two systems, the feldspars are said to be dimorphous; and the group may be described as consisting of a series of isodimorphous mixtures of the orthoclase albite and anorthite molecules.

Frequent parallel intergrowths of two varieties of feldspar occur; for example, albite may be intergrown with microcline or orthoclase, where the albite shows as narrow irregular bands of a different-colored mineral matter running across the cleavage surfaces of the orthoclase or microcline. Such intergrowths are called perthitic intergrowths or perthite because certain flesh-red feldspars from Perth, Canada, were first shown to be made up of such intergrowths. These intergrowths are sometimes so minute as only to be made out with the microscope, and then they are called microperthite. Brögger has suggested that certain soda-orthoclases are intergrowths of this kind in which the albite lamellæ are so narrow as not to be discoverable even with the highest powers of the microscope. For these supposed intergrowths he proposes the name cryptoperthite.

Similar parallel intergrowths of distinct mineral species may occur where quartz is intergrown with microcline. Such intergrowths of quartz and feldspar (usually orthoclase or microcline) are common in certain granite-like rocks called pegmatite, and are known as pegmatitic intergrowths, or graphic granite, referring to the resemblance of the curious V-shaped areas of quartz to cuneiform writing.

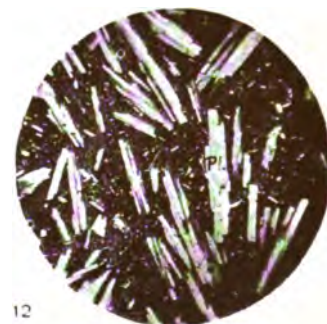
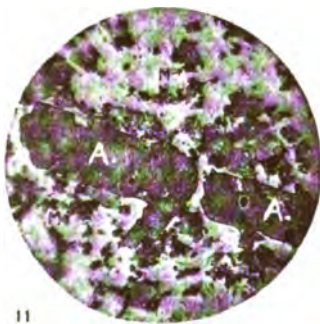
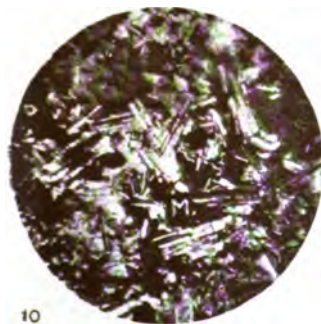
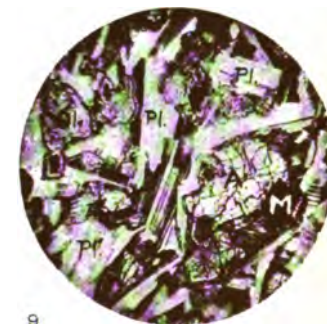
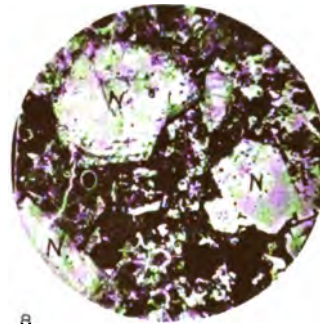
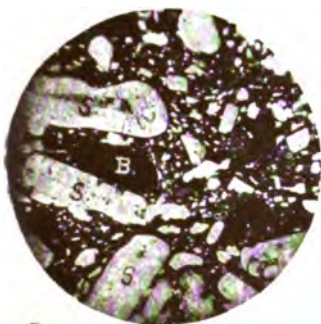
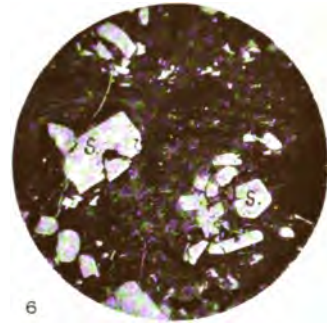
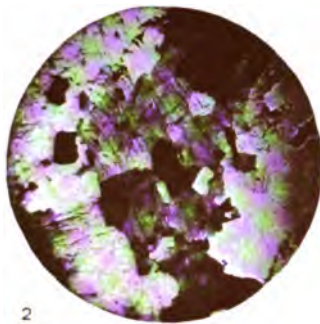
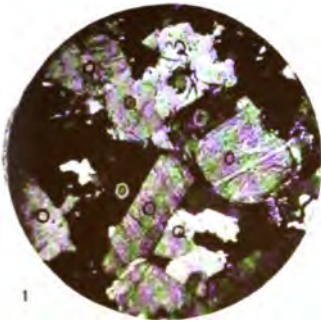
GROUP III.

Feldspathoids.—The minerals of this group are called feldspathoids or feldspar-like minerals, more particularly because of their chemical resemblance to the feldspars. There are but two species which need be considered here: leucite, which has a chemical composition expressed by the formula $\text{KAl}(\text{SiO}_3)_2$; and ne-

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- FIG. 1. Micro-photograph of thin section of granite, from Lokken, Norway, between crossed nichols, showing patchy appearance of soda-orthoclase (O), irregular plates of quartz (Q), and illustrating granitoid (xenomorphic or allotrimorphic) texture. The orthoclase shows twinning.
- FIG. 2. Micro photograph of thin section of augite-syenite from Laurvik, Norway, between crossed nichols. The photograph shows only plain non-striated orthoclase and illustrates granitoid allotrimorphic or xenomorphic texture. The lines due to cleavage.
- FIG. 3. Micro-photograph of thin section of norite, from Hitteroe, Norway, between crossed nichols, showing banded plagioclase Labradorite (Pl), an opaque ore, ilmenite (I), and a monoclinic pyroxene diallage (D). The section also illustrates granitoid (xenomorphic or allotrimorphic) texture. A fringe of biotite surrounds part of the ore.
- FIG. 4. Micro-photograph of thin section of Perthite, between crossed nichols, showing intergrowth of albite (Ab) and microcline (Mi). The albite shows banding and the microcline cross-hatching.
- FIG. 5. Micro-photograph of thin section of graphic granite from New Bedford, Mass., between crossed nichols, showing parallel intergrowth of quartz (Q) and microcline (Mi). The latter shows cross-hatching.
- FIG. 6. Micro-photograph of thin section of porphyritic perlite showing sanidin crystals (S) in glassy ground mass. Dark wavy bands indicate flow in the mass before cooling (flow structure).
- FIG. 7. Thin section of porphyritic trachite showing sanidin (S) and biotite (B) in glassy ground mass. The crystals have been co-eroded or re-dissolved by the magma as is shown by their even curved boundaries.
- FIG. 8. Micro-photograph of thin section of tiaguaite porphyry from the Odenwald showing idiomorphic crystals of nepheline (N), also an indistinct zonal structure in the same.
- FIG. 9. Micro photograph of thin section of olivine norite, from Risor, Norway, showing long lath shaped crystals of plagioclase (Pl), augite with characteristic nearly rectangular cleavage (A), olivine altered on the margins to serpentine (Ol), and an opaque ore (M).
- FIG. 10. Micro photograph of thin section of liabase between crossed nichols, showing ophitic structure. It contains plagioclase (P), augite (A), and magnetite (M).
- FIG. 11. Micro photograph of thin section of Essexite from Gran, Norway, showing hypidiomorphic augite crystals (A), and opaque grains of magnetite (M) in a fine ground mass of plagioclase. It illustrates hypidiomorphic-porphyritic texture.
- FIG. 12. Porphyritic basalt (melaphyre) with phenocrysts of plagioclase (Pl) in a dense micro-crystalline ground mass consisting of augite, magnetite and a second generation of plagioclase crystals.

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phelite, having the composition $K_2NaAl_3Si_3O_{10}$. Chemically leucite resembles orthoclase feldspar. In addition to being chemically like orthoclase, leucite, like its counterpart, alters to kaolin. But more interesting still is the fact that on decomposition it has been known to furnish orthoclase or orthoclase and muscovite.

Nephelite, as its chemical composition indicates, is analogous to the plagioclase feldspars. It is hexagonal in character. The decomposition of nephelite, like that of the plagioclases, usually results in the formation of some one of the zeolites, or more rarely it forms kaolin.

GROUP IV.

Mica.—Two species here are of widespread occurrence; one is muscovite, the white, silvery, potash variety, having a chemical composition corresponding to $H_2KAl_2(SiO_3)_2$. Chemically it is closely allied to orthoclase, and frequently results as an alteration product of that mineral. Optically it is distinctly biaxial. The second species, biotite, is dark-colored, owing to comparatively high percentages of iron. It also contains varying amounts of magnesia, and might thus be properly classed with the following group of minerals. It is very nearly uniaxial. It has the chemical composition $(HK)_2(MgFe)_2(AlFe)_2(SiO_3)_2$.

GROUP V.

The Ferromagnesian Minerals.—The minerals of this group take their name from the fact that they contain iron and magnesia as two of their prominent constituents. In addition they may contain lime and alumina in considerable amounts, also some alkali. The more important members of the group are included under the amphiboles and the pyroxenes, two species having numerous varieties, which pass into each other by isomorphous mixture. They form two parallel series which are both chemically and crystallographically analogous. Their relationship can best be shown by the following table:

Amphibole	
(a) Orthorhombic	
Anthophyllite	$MgSiO_3$
(b) Monoclinic	
Tremolite	$CaMg_3(SiO_3)_4$
Actinolite	$Ca(MgFe)_2(SiO_3)_4$
Hornblende	$\{ Ca(MgFe)_2(SiO_3)_4$
Glaucophane	$\{ CaMg_2Al_2(SiO_3)_4$
(c) Triclinic	$NaAl(SiO_3)_2, MgSiO_3$
Ænigmatite	$Na_4Fe_3AlFe(Si,Ti)_{12}O_{38}$
Pyroxene	
(a) Orthorhombic	
Enstatite	$MgSiO_3$
Hypersthene	$(Mg,Fe)SiO_3$
(b) Monoclinic	
Diopside	$MgCa(SiO_3)_2$
Augite	$\{ CaMg(SiO_3)_2$
Acmite	$\{ MgAlSiO_4$
(c) Triclinic	$NaFe(SiO_3)_2$
Rhodonite	$MnSiO_3$

The really important rock-forming amphiboles and pyroxenes are to be found among the orthorhombic and monoclinic varieties. And it is necessary to distinguish here between those which are aluminous and those which are non-aluminous, for the special reason that the former on alteration produce chlorite, while the latter produce serpentine.

One other important rock-former must be mentioned as belonging to this group—olivine,

so called on account of its usual olive-green color. It has the chemical composition $(Mg,Fe)_2SiO_4$, is orthorhombic in crystallization, and readily decomposes to serpentine.

GROUP VI.

Ores.—Minerals of this group have iron as their principal constituent, and frequently constitute ores of that substance. Included here are:

Magnetite	$FeFe_2O_4$
Pyrite	FeS_2
Hematite	Fe_2O_3
Ilmenite	$FeTiO_3$
Chromite	$FeCrO_4$

Thus far the mineral species enumerated are mostly found as the essential constituents of that class of rocks hereafter to be described as igneous.

GROUP VII.

Accessory Minerals.—Those minerals which are usually of subordinate importance, and which are therefore more in the nature of accessory than notable rock-constituents, are included here:

Cassiterite	SnO_2
Rutile	TiO_2
Titanite	$CaTiSiO_5$
Apatite	$Ca_4(CaF)(PO_4)_3$
Monazite	$(Ce,La,Di)PO_4$
Corundum	Al_2O_3
Spinel	$MgAl_2O_4$
Garnet { Almandite	$Fe_3Al_2(SiO_4)_3$
Grossular	$Ca_3Al_2(SiO_4)_3$
Staurolite	$Fe(AlO)_2(AlOH)(SiO_4)_2$
Chastolite	$Al(AlO)SiO_4$
Kyanite	$(AlO)_2SiO_3$
Fibrolite	Al_2SiO_5
Cordierite	$(Mg,Fe)_2Al_2Si_2O_{10}$
Tourmaline	$(Na,Mg,Al)_2(AlFe)_2(BOH)_4Si_6O_{28}$
Topaz	$(AlF)_2SiO_4$
Fluorite	CaF_2
Zircon	$ZrSiO_4$
Allanite	$(CaFe)_2(AlCaFe)_2AlOH(SiO_4)_3$
Zoisite	$Ca_2Al_2(AlOH)(SiO_4)_2$

Some of the above minerals occasionally come to be of considerable importance, or may even constitute the bulk of the rock-mass. As a rule, however, they are of minor consideration and frequently even negligible.

GROUP VIII.

Secondary Minerals.—Minerals of this class have originated as the result of the decomposition or alteration of some previously existing primary or original mineral. The most noteworthy are:

Kaolin	$H_4Al_2Si_2O_9$
Serpentine	$H_4Mg_3Si_2O_{10}$
Talc	$H_2Mg_3(SiO_3)_4$
Chlorite	$H_2(Mg,Fe)_2Al_2Si_2O_{10}$
Epidote	$\{ Ca_2Al_2(AlOH)(SiO_4)_2$
	$\{ Ca_2Fe_2(FeOH)(SiO_4)_2$

Kaolin results from the decomposition of orthoclase and other feldspars by the loss of some of the silica and alkalis, and by the addition of water (hydration). Serpentine results from the alteration of olivine and the non-aluminous hornblendes and pyroxenes by the loss of some of the magnesia and by an addition of water. Talc is formed by the hydration and partial decomposition of several of the lime-magnesia or non-aluminous ferromagnesian minerals, namely, tremolite, pyroxene (chiefly enstatite), phlogopite mica. Chlorite results most

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frequently from the alteration of the aluminous hornblendes and pyroxenes. Epidote also results from the alteration of the aluminous varieties of hornblende and pyroxene, especially those having some lime in their composition.

GROUP IX.

Precipitations from Aqueous Solutions.—The following minerals occasionally form im-
 hypotheses are at present recognized as possible
 tion from solution in water:

Salt	NaCl
Gypsum	$\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
Aragonite or Calcite	CaCO_3
Hydrous Silica	$\text{SiO}_2 \cdot n\text{H}_2\text{O}$
(Geyserite or Silicious Sinter)	

Origin of Rocks.—Two alternative hypotheses are at present recognized as possible explanations of the origin of the earth: (1) the old so-called nebular hypothesis, propounded by Kant and Swedenborg and later elaborated by Laplace and others; (2) the newly proposed accretion theory or planetesimal hypothesis propounded by Professor Thomas C. Chamberlin of the University of Chicago. The first of these supposes that the earth was originally in a gaseous condition, from which, under its own gravity and by a radiation of its heat, it passed into a fluid state and thence to a solid form. The "original crust" of the earth (lithosphere) formed at the surface as the result of a cooling of the molten materials of the globe. Furthermore, the earth may have solidified from the centre outward as the result of pressure. Others suppose that the original crust was not only added to from below by the crystallization of molten material, but also increased in thickness from above by chemical precipitations from the intensely heated hydrosphere. The accretion theory, on the other hand, supposes that the earth as a whole never was in a gaseous or even fluid condition, but was built up by the infalling of cold, solid, discrete particles of matter called planetesimals; that the present internal heat is the result of pressure due to gravity. Adherents of both these hypotheses agree, however, that the oldest known rocks, the original or primitive rocks from which all others have been derived, are of igneous origin, that is, were once in a molten condition, from which they cooled to the solid state, and in so doing formed more or less thoroughly crystalline aggregates of different kinds of minerals.

In discussing the origin and descent of rocks we must therefore start with the more common igneous varieties, and show how they have furnished materials for the others.

Rock Disintegration.—Granite is one of the most abundant and widespread of igneous rocks, and is a most important species among the numerous other primitive rocks of the lithosphere. The changes which take place in it in the process of its decay can be taken as illustrative of those which take place in the disintegration of all other primitive rocks. Granite consists of quartz, orthoclase feldspar (with some soda-orthoclase microcline or plagioclase), and light or dark mica, or both, or perhaps hornblende in place of the micas.

On decomposition under the influence of atmospheric agencies, it falls to a more or less rusty, clayey mass of sandy or gravelly material,

the sandy or gravelly part consisting of angular fragments of the original quartz (which is practically unaffected by atmospheric agencies), and fragments of still undecomposed feldspar. The clayey portion of the alteration products results from the decomposition of the feldspar and consists largely of kaolin, which in a pure condition is a white powdery or plastic material, according to whether it is dry or wet. It is usually stained rusty brown by iron oxide, which results from the decomposition of any ferromagnesian constituent contained in the rock, or from small particles of some one of the ores which are quite certain to have been present in small amounts. Certain constituents of the original minerals are carried off in solution: the alkalis and a part of the silica—the feldspars; also a portion of the iron of the ferromagnesian minerals, together with some of the magnesia and much of the lime that may have been present as a minor constituent.

This mass of loose, more or less rusty, incoherent material remaining behind is termed residual granite. Rocks of whatever nature are in like manner subject to decomposition by atmospheric agencies, and their residual materials everywhere cover the greater portion of the surface of the underlying rocks, and constitute what is termed mantle-rock or detritus. A part of this mantle-rock consists not of residual material in the strict sense, but is made up of angular fragments of various sizes, which have been broken from the rock-masses by the action of frost. At the foot of nearly every steep cliff is to be found an accumulation of angular rock-fragments called talus, rock-slide, or breccia.

Removal of Rock-waste and Its Deposition in the Form of Sediments.—Most of the various materials of the mantle-rock, whether residual or fragmental, find their way sooner or later, chiefly by the action of rain or frost, to the neighboring streams, and are borne by them to the rivers, which in turn transport them, after numerous halting-periods, to the sea or to smaller bodies of salt or fresh water. In this process of transportation the angular rock-fragments are reduced by attrition to rounded pebbles. The angular grains of quartz also become rounded and water-worn, while much of the material becomes reduced to an impalpable mud. These more or less finely comminuted and abraded materials are distributed along the shores of lake or sea. Gradually the finer, more easily suspended and transportable materials are carried out into deep water, the finest and most impalpable muds being transported farthest from the shore; so that, broadly speaking, the washings from the land surface become distributed over sea and lake bottom in order of fineness, beginning with the coarsest gravelly materials at the shore-line, and growing successively finer toward the deep water, where finally only the impalpable silts and muds are deposited.

Stratification.—In addition to this more or less gradual horizontal change from coarse to fine materials brought about by the transporting power of water, there is always to be observed a much more sudden and abrupt change vertically, by which materials of various sorts and degrees of fineness are arranged by the sorting power of the same medium (water) into horizontal beds of varying thickness, which are separated from each other by sharply defined planes of demar-

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cation called sedimentation or bedding planes. Beds which consist of the same material mineralogically are called strata. But a stratum may be made up of thinner beds, owing to a difference in the fineness of the material which composes it. These subdivisions of a stratum are called layers, and layers in their turn may be composed of extremely thin beds, only the very small fraction of an inch in thickness, called laminae. Strata vary in thickness from a few inches to several feet. All materials deposited in water are called sediments; and all sediments were originally deposited in nearly horizontal position. These nearly horizontal strata slope or dip slightly toward deep water, and this slight inclination is known as initial dip. All materials deposited in water are stratified, and this is the chief characteristic of all rocks so formed. The converse statement of this is that all stratified rocks are of aqueous origin. Rocks of this character are called sedimentary.

Consolidation of Sediments into Coherent Rock-masses.—Sediments have accumulated to a very great thickness during geologic time. Those sediments which have been deeply buried and have been subjected to great pressure have been made to cohere either as a direct result of this pressure or by a cementing together of the particles by mineral substances in solution; namely, silica, carbonate of lime, carbonate of iron precipitated as the oxide.

The Metamorphism of Sediments.—Those most ancient of all sediments which were derived from the disintegration of the original or primal rocks of the lithosphere, and which were first deposited in the primordial seas, have been so deeply buried in the crust of the earth as to have been affected by the uprising heat of the earth's interior. This heat, united with the tremendous pressure exerted by the superincumbent mass of sediments and the dissolving effect of the intensely (super-) heated moisture present, reduced the sediments to a partly fused, partly dissolved, more or less pasty condition (aqueo-igneous fusion), from which they subsequently cooled, thereby changing into thoroughly crystalline masses, consisting of distinct mineral aggregates more or less resembling the crystalline rocks of the igneous type, but different from the latter chiefly in this, that the original stratification (bedding) planes are still visible. Such rocks are utterly changed in everything except their chemical composition from their original condition and appearance, and are said to be metamorphosed. As a class they compose the metamorphic rocks. It is not alone these ancient sediments which have suffered transformation. Sediments of every geologic age have been found in some quarter of the globe in the metamorphosed condition.

General Classification of Rocks.—All rocks can be classified according to their origin as follows: (1) igneous; (2) aqueous; (3) æolian; (4) glacial; and (5) metamorphic.

Igneous Rocks.—(Definitions depending upon external form and mode of occurrence.) Igneous rocks comprise all those portions of the lithosphere which are or were in an intensely heated and more or less fluid condition and which have subsequently solidified by cooling into massive, more or less crystalline bodies of varying sizes and shapes. They occur as in-

trusions into or replacements of some previously existing rocks of the lithosphere, either sedimentary, metamorphic, or igneous. Where a huge mass of molten material slowly melts its way from some deep-seated portion of the earth up into the overlying rocks by dissolving them and incorporating them in its own mass, and subsequently cools there, slowly, without ever reaching the surface, forming a great irregular body of coarsely crystalline matter frequently scores of miles in extent, we have what is termed a batholith. In its molten condition it would be termed a magma and the reservoir in which it was contained would be called a magma basin. The period of its existence as a fluid mass is termed the intratelluric (within-the-earth) period. It might have extending from it (usually upward) irregular, more or less elongated, arm-like processes called apophyses. Should cracks or fissures form, they would be instantly filled by the inrush of fluid substance, which would solidify with comparative rapidity to form dikes. In stratified rocks dikes usually cut at some angle across the strata. Where the molten material intrudes itself between the strata parallel to the bedding planes in broad sheets, it is called an intrusion-sheet or sill. Where the overlying strata become lifted and arched upward into a huge dome without breaking above and letting the fluid rock escape, the solidified lenticular mass constitutes a laccolith or laccolite. Where the molten rock actually escapes to the surface by means of a fissure or other conduit, and flows out over it in a broad sheet, it is termed a flow, lava-flow, or intrusion-sheet. The interval of time elapsing between the outbreak of the magma from its reservoir and its subsequent cooling to the solid state is termed the effusive period. If the conduit is rudely cylindrical the lava accumulates about the vent, forming a lava or volcanic cone. Subsequent erosion may entirely remove the cone and expose the cold lava in the conduit, to which the term volcanic neck is applied. In fact it is only through the exposure of these deep-seated masses of cooled igneous material by erosion that we are enabled to study them. Over the more ancient land areas many miles of rock, vertically measured, have been removed, laying bare the underlying rocks to a corresponding depth.

The Modern Conception of Rock Magmas.—The popularly accepted idea of lava is that it is rock which has been fused by great heat. In fact the older conception of scientific men was that magmas consisted of fused rock-masses. Recent opinion, however, based on the revelations of the microscope and experiments in the synthesis of minerals and rocks, tends to regard them as solutions of one mineral substance in another or of several mineral substances mutually in each other. One of the chief reasons for thinking them such can be stated as follows: If magmas are fusions then the individual mineral constituents potentially present in them should crystallize out according to their fusibilities, beginning with the least fusible, but they do not. On the other hand, as the magma slowly cools, the first individual mineral species makes its appearance when the point of saturation for that particular species is reached, and the others follow in the order of their solubilities. For example, in granite (which consists

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of quartz, feldspar, and mica or hornblende, with some accessory constituent, such as apatite, or zircon, and, it may be, also a small amount of one or more of the ores), the order of crystallization is: (1) the ores with apatite and zircon; (2) mica or hornblende; (3) feldspar; (4) quartz. Quartz is the least fusible, and should appear first under the fusion theory. As a matter of fact it appears last. In short, all of the materials appear in the reverse order of what we would expect if they are true fusions. But they do appear in the order of their solubilities. Pressure, however, exerts an important influence upon the solvency of a substance, and as this is variable the order of appearance is not absolutely fixed. Moreover, heat, the most important factor involved, is very variable, and still farther modifies the problem.

*The Splitting or Cleavage of Magmas (Spaltung).—*When a magma cools, the first minerals to appear are the ores (with apatite, titanite, zircon, etc.); following these, the basic ferromagnesian constituents; then the more basic plagioclase feldspars, followed or overlapped by the orthoclase varieties; and last of all, quartz, if more than enough exists for the formation of the silicates. Obeying the principle of diffusion, the first minerals to form—the more basic ones—tend to accumulate on the cooling walls, that is, at the periphery of the magma-basin; and the other minerals arrange themselves rudely in concentric zones, each zone toward centre being successively more acid, until at the centre the magma becomes comparatively acid and may, after solidification, consist largely of such minerals as orthoclase and quartz. This arrangement of the minerals by diffusion before crystallization results in the rude separation of an originally uniform magma into several magmas of different chemical compositions, which, on cooling, furnish rocks of different mineralogical compositions. This process is termed the cleavage of magmas.

Definitions depending upon internal characteristics will next be considered.

Texture.—The fluid magmas of igneous rocks may be compared to molten glass. If the cooling period be long the individual minerals form comparatively large crystals. If it be short the crystals are correspondingly small. If it chills so suddenly that the molecules of the different mineral compounds do not have time to unite to form crystals, but are caught just as they existed originally in the fluid magma, the result is a volcanic glass. Rocks in which the crystals are 5 millimetres or more in diameter may be called coarse-grained; rocks in which the crystals range in size from 1 to 5 millimetres, medium-grained; and those in which they are 1 millimetre or less in diameter, fine-grained. Rocks in which all of the original magma has individualized or crystallized, to form minerals of some sort, and in which there is no unindividualized material remaining behind in the form of glass, are called holocrystalline. All rocks in which the crystals are large enough to be seen with the unaided eye are termed phanocrystalline, or phaneric. Those rocks in which the crystals are too small to be distinguished megascopically are called aphanitic. Many aphanitic rocks, however, under the microscope are seen to be holocrystalline and to consist of small crystals of minerals which can be speci-

cally identified with the aid of that instrument. For these rocks the term microcrystalline has been proposed. But the crystals, though recognizable, may be too small to be specifically identified even with the microscope. Such rocks are called microcryptocrystalline. Volcanic glasses show only embryonic crystals (microlites, trichites, crystallites) imbedded in textureless glass. Such rocks are said to be vitreous or glassy.

If during the entire period of solidification the conditions of cooling remained the same and the entire process of cooling of a deep-seated magma was slowly and quietly accomplished in the magma-basin, unattended by any effusive period, the rock would be coarse (to fine), evenly-granular. In rocks cooling under these circumstances the growing crystals have usually interfered with each other in such a way as to mutually destroy their crystal boundaries, forming irregular interlocking grains, with no one diameter much greater than the others. In other words, the grains are irregularly rounded. A texture of this sort is characteristic of the granites, and is called the granitic or granitoid texture. The term allotrimorphic, referring to the fact that the crystals do not possess their own boundaries, is applied to the same texture, and a still newer term, xenomorphic, has recently been proposed. Where the majority of the crystals do retain their crystal boundaries, the resulting texture is called idiomorphic or automorphic. If the crystal boundaries are only faintly or imperfectly discernible, the structure is said to be hypidiomorphic.

The period of intratelluric solidification may be interrupted by an effusive period; in which case those crystals which had begun to form, and may have reached considerable size, during the intratelluric interval, are carried by the eruption into other surroundings, where the cooling process may be much accelerated. A second generation of smaller crystals would then form about the large well-formed ones, imbedding them in a fine-grained or possibly aphanitic ground-mass, producing what is termed porphyritic texture. Two or more generations of crystals may thus be recognized. The well-defined crystals of the first generation are usually pronouncedly idiomorphic, and are called phenocrysts. The term felsite is applied to the aphanitic ground-mass of the acid rocks.

The crystals of some one mineral species in a rock may have one diameter much larger than the others. The crystals then appear distinctly lath-shaped in thin section under the microscope. This form of crystallization is especially common with the plagioclase feldspars. These laths of plagioclase are enclosed by crystals of another species. This texture is common, and in the scheme of classification of igneous rocks at present accepted is called into rather prominent requisition. It is known as the ophitic texture.

Flow-structure is exhibited by the parallel arrangement or orientation of minerals in lines which indicate the direction in which the fluid rock had been moving before solidification took place, or while it was in a viscous state.

Classification of Igneous Rocks.—The classification of igneous rocks as at present widely accepted is based upon three things: (1) chemical composition; (2) mineralogical composition; (3) texture. (The proposed 'Quantitative

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Classification of Igneous Rocks, published jointly by Cross, Iddings, Pirsson, and Washington, University of Chicago Press, 1903, is the most logical and satisfactory attempt at a thoroughly scientific classification of the igneous rocks yet proposed, and bids fair to be epoch making.)

Chemical Composition.—The chemical composition of igneous rocks is primarily expressed in terms of silica percentage. Rocks which contain from 60 to 80 per cent of silica are called acid. Most of these rocks contain free quartz; those which range from 40 to 60 per cent in silica are called basic, and rarely possess free quartz in any considerable amount; while those which fall below 40 per cent are termed very basic. Generally speaking, as the silica percentage declines the percentage of the bases (lime, iron, magnesia) increases. This change in chemical composition from acid to very basic is indicated by change in color, the acid rocks being light ash gray, while the very basic are dark.

Mineralogical Composition.—Quartz is more or less abundant in rocks of the acid division, but soon disappears in passing toward the basic end of the series. Orthoclase is the dominant feldspar among the acid rocks, but even here the plagioclases are more or less common. Among the basic rocks the plagioclases prevail, and in a general way change from the albite to the anorthite variety as the more basic rocks are approached, but fail entirely in most rocks of the very basic division.

The ferromagnesian minerals are subordinate, almost negligible, in the very acid rocks. They become dominant in the basic and constitute the bulk of the very basic rocks.

The ores, chiefly magnetite, chromite, and ilmenite, are found more or less sparsely disseminated through all three divisions, but they become notable constituents among the basic and very basic rocks, and may even segregate to form important bodies of ore.

Texture.—As already explained, magmas which solidify deep within the lithosphere usually form coarse (to fine) evenly-granular rock-masses, having the granitoid texture, although they may be more or less porphyritic or idiomorphic in character. These deep-seated rocks are called plutonic. Where eruption takes place those rocks which solidify somewhere between the magma-basin and the surface (as intrusion-sheets, dikes, laccolites, etc.) are called intrusive, while those which cool subaerially (or it may be beneath bodies of water) are called effusive or extrusive. While neither the plutonic, intrusive, nor extrusive members are limited to any one kind of texture, it is true that the plutonic rocks are more frequently granitoid, and the intrusive and extrusive members even-fine-grained, felsitic, aphanitic, or porphyritic in texture, while the textureless volcanic glasses are nearly always extrusive.

Rock-families: 1. Acid Division; Granites.—The granites are plutonic rocks occurring frequently as huge irregular masses, which have slowly melted their way up from some deep-seated region into the more ancient and then deeply-buried portions of the lithosphere; or they may occur as apophyses or dikes given off from some parent mass. Mineralogically they consist of quartz, dominant feldspar of the orthoclase variety (with subordinate amounts of

soda-orthoclase, microcline, or oligoclase), and muscovite or biotite mica, or both. Typical granite has muscovite. Where biotite alone is present it is called granitite. Where hornblende or tourmaline replaces the mica, the rock is called hornblende- or tourmaline-granite. Where mica fails and the rock consists of quartz and orthoclase, it is termed aplite. Where feldspar fails and only quartz and mica remain, the rock is called greisen. Aplite and greisen are the most acid forms of the granites. As accessory constituents might be mentioned, zircon, allanite, cassiterite, rutile, titanite, magnetite. By a gradual decrease of quartz the granites pass imperceptibly into the syenites (to be described later), and by similar changes into the diorites.

There is a form of granite called pegmatite, which is found in veins or dikes. It is very coarsely granular. The crystals of feldspar sometimes measure a foot or more in diameter, while the quartz and muscovite crystals correspond in size. Pegmatite is the source of nearly all of the white mica of commerce. It is also remarkable as being the home of a variety of extremely rare minerals—compounds of thorium, lanthanum, yttrium, etc.—among which may be mentioned uraninite or pitch-blende, the present source of radium. Pegmatite is characterized by the interesting parallel intergrowth of feldspar and quartz, already referred to, called graphic granite. Pegmatite is particularly noteworthy, however, as having been deposited from an intensely heated aqueous solution, perhaps from vapor of water (mingled with other gases, such as carbonic acid, hydrofluoric acid, boracic acid, etc.), which was under such great pressure that it bordered on the fluid condition. The minerals of pegmatite, more particularly the quartz crystals, are frequently filled with fluid inclusions of water or carbonic acid. A great variety of minerals and a few rocks are considered to have been formed in this manner, and are said to be of pneumatolytic origin (Greek, *πνευματώδης*, to turn into air), and such processes are termed pneumatolytic processes. Furthermore, since these processes usually succeed some great volcanic outbreak, they are termed post-volcanic processes.

The granites as a family have a range in silica which varies between 65 and 80 per cent.

Where a magma of the chemical composition of granite erupts, it may form dikes, sheets, or flows. The rocks may have a variety of colors, but they are prevailing light ash gray. Where crystalline, they possess the same mineral constituents as granite, except that the feldspar is apt to be the glassy variety of orthoclase called sanidine. The porphyritic texture prevails among the intrusive and extrusive forms alike.

The geologically older intrusives of this family are called quartz or orthoclase porphyry according to whether the phenocrysts imbedded in the felsitic ground-mass are quartz or orthoclase. The strictly extrusive forms of granite are known as rhyolites (from the Greek word which means to flow), so called because of the flow-structure which is commonly developed in them. The rhyolites are rarely holocrystalline, containing nearly always more or less glass, and occasionally consisting wholly of it. These entirely glassy forms of rhyolite are called obsidian. Perlite and pitchstone are varieties of obsidian. Occasionally the rhyolites are frothy

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in character, due to the rapid escape of steam resulting from the relief from great pressure. This form is known as pumice. Rhyolite is also called liparite because extruded abundantly from the volcanoes of the Lipari Islands.

Syenite.—The hornblende granites, as already explained, are those in which the mica has been replaced by hornblende. An occurrence of such a rock at Syene (now Assuan) on the Nile, was called syenite from its locality. Of late the term has been restricted to quartz-less rocks consisting primarily of orthoclase and hornblende. Rocks of the syenite family usually carry varying amounts of plagioclase, and may contain subordinate quartz. Apatite, zircon, titanite, and magnetite are uniformly present as accessory constituents. In texture they are granitoid and, by an increase of quartz, grade over completely into the granites, or by an increase of the plagioclase pass over into the diorites (described below). Where augite replaces the hornblende the rock is called augite-syenite; where mica replaces it, minnette. Nepheline and orthoclase constitute nepheline-syenite.

The range in silica percentage for the typical syenites is between 55 and 65 per cent.

When a magma having the chemical composition of a typical syenite erupts it forms dikes, sheets, and flows, closely resembling the eruptive forms of granite, but without quartz. The loosely applied mining term porphyry is used indiscriminately for the eruptive members of both the granite and syenite families. True eruptive syenite, however, is called trachyte, from the Greek word which means rough. The most typical occurrences are light-colored, ashy-gray rocks, either aphanitic or porphyritic in texture, with usually some glass in the ground-mass. When porphyritic the phenocrysts are of the glassy variety of orthoclase called sanidine. In fact, the entire feldspathic constituent is chiefly of this variety.

The eruptive form of nepheline-syenite is called phonolite because of the ringing sound which thin plates make when struck with a hammer, and certain dike-rocks of the mineralogical composition of nepheline-syenite with pronounced porphyritic texture, are called tinguaites.

Rock-Families: II. Basic Division; Diorites.—These diorites are plutonic rocks having a silica percentage running from 50 to 65 per cent. They are of medium acidity, and the magmas from which they are formed may be considered as approaching closely the hypothetical parent magma from which, by the process of cleavage, the other rock-families, acid, basic, and very basic, may be thought of as having originated. Mineralogically they consist of hornblende and plagioclase feldspar. Those in which mica replaces a part of the hornblende are called mica-diorites, while the same constituents plus quartz go by the name of quartz-diorites, granite-diorites, or tonalites. These rocks mark the transition to the granites. Augite-diorites are rocks of the diorite type, in which hornblende is replaced in part by augite. They grade over into the gabbros.

Certain intrusive (dike) rocks of the mineralogical composition of the diorites are called camptonites, while other similar intrusives having both biotite and augite are called kersantites.

Extrusive rocks having the chemical and mineralogical composition of the diorites are called andesites. Typical andesites are aphanitic, felsitic, or porphyritic in texture, and closely resemble the trachytes, the main distinction being that they contain plagioclase (andesine or oligoclase) instead of orthoclase. The ferromagnesian constituent is hornblende, but may be either biotite or augite. The rocks are named because of their common occurrence in the Andes Mountains.

Acid andesites containing free quartz are known as dacites, a name derived from the old Roman province of Dacia, now a part of Hungary.

The Gabbros.—The gabbros are coarse- to fine-granular, granitoid rocks of plutonic origin, having a silica percentage ranging from 45 to 55 per cent. As originally defined they consisted of plagioclase (labradorite) plus a pyroxene, of the variety known as diallage; but more recently the name has been applied to a great variety of rocks consisting of a plagioclase (at least as basic as labradorite) plus any kind of pyroxene, either monoclinic or orthorhombic. If olivine be present it is known as olivine gabbro.

The name norite is applied to that member of the gabbro family which consists of plagioclase and enstatite. If olivine be present it is called olivine-norite. The ferromagnesian constituent may fail and the rock thus consist of labradorite feldspar alone, in which case it is known as anorthosite (from the French word for triclinic feldspar).

The accessory mineral constituents are apatite, titanite, ilmenite, magnetite. The first and last mentioned are usually abundant, and the latter may segregate to form ore deposits.

Diabases.—These may properly be discussed in connection with the gabbros, for they have the same mineralogical composition, and while they may occur as true plutonic rocks they occur commonly in the form of dikes or sills, and may be considered as the intrusive form of the gabbros. Their chief distinguishing feature perhaps is their texture, which, under the microscope, if not in the hand-specimen, is seen to be ophitic. This, in short, is the essential distinction between the gabbros and the diabases as ordinarily considered. In granularity they range from coarse to aphanitic. They are sometimes strikingly porphyritic, with perfect automorphic phenocrysts of augite imbedded in an aphanitic, ground-mass of augite and plagioclase (labradorite or anorthite). Dolerite is a term used interchangeably with diabase, but refers more particularly to the porphyritic varieties. The basalts or traps are the dense black aphanitic extrusive forms of diabase or dolerite, but they grade over into the diabases by imperceptible stages. The basalts constitute great surface flows of unparalleled extent, covering thousands of square miles. On cooling they frequently break, by shrinking, into hexagonal prisms, which have their long diameters normal to the cooling surfaces. This is known as the columnar structure of basalt, so famously exhibited at the Giant's Causeway, on the northeast coast of Ireland.

Olivine is a more or less constant mineral in the basalts, which have been divided into the

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olivine-free and olivine-bearing varieties. More rarely they contain nepheline or leucite in considerable amounts, and are then called tephrites. If both olivine and leucite or nepheline are present they are termed basanites.

Very Basic Division: Peridotites, Pyroxenites, Hornblendites, and Dunites.—Rocks of this division, as already explained, include those from which not only free quartz has disappeared, but also the feldspars, at least as notable constituents. They consist essentially of a mixture of ferromagnesian constituents plus one or more of the ores. Olivine and pyroxene (usually augite) together constitute peridotite (from the French word for olivine). If hornblende be substituted for augite the rock is known as hornblende-peridotite. If the rock consists essentially of pyroxene it is called pyroxenite; or of hornblende alone, hornblendite, or of olivine alone, dunite. They have as accessory constituents magnetite, chromite, ilmenite, and apatite. Chromite rarely occurs in such abundance in the peridotites as to be of economic value.

A certain rare basaltic rock of the mineralogical composition of peridotite, consisting of augite and olivine in a glassy ground-mass, occurs at Limburg in Kaiserstuhl, Baden. It is called limburgite. Dense porphyritic rocks consisting of augite and magnetite in a glassy ground-mass represent the effusive member of the pyroxenites, and are called augitites.

Rocks of Aqueous Origin.—Rocks deposited in water are called sedimentary, and are always stratified. In this respect they are distinguished from typical igneous rocks, which are unstratified and massive. Sedimentary rocks can be classified as follows: (1) mechanical sediments of terrigenous origin; (2) mechanical sediments of organic origin; (3) chemical precipitates.

Mechanical Sediments of Terrigenous Origin.—Included here are all those substances which have been washed from land surfaces and deposited in the seas or other bodies of water, as above explained. The principal varieties are: (1) Conglomerates, otherwise known as pudding-stones. These are solidified gravels, in which coherence is due to some cementing principle (lime, iron, or silica) to pressure, or to both. Where the fragments of rock are angular, as though freshly broken, the rock is called breccia. Breccias are not all of water origin. They are occasionally terrestrial. In either case they have not been transported far from the parent ledge, as their sharp corners indicate. (2) Sandstones, consolidated sand-beds. Where the cement is calcareous they form calcareous sandstones. They are also called silicious or ferruginous, according to the character of the cement. Argillaceous sandstones contain an admixture of clay. Coarse sandstones containing grains of undecomposed feldspar are called arkose. (3) Shales, solidified clays or muds. They may contain some sand, and are then said to be arenaceous; or they may contain lime in the form of shell-fragments or impalpable limy material, and are then called marls. Marls are thus in part of organic origin.

Mechanical sediments of the character above described accumulate alike in seas and lakes. Those deposits made in the sea are called marine; those made in lakes, lacustrine.

Mechanical Sediments of Organic Origin.—These may be the result of the accumulation of

either animal or plant remains. The accumulation of hard parts of animals, such as the shells of mollusks and other mollusk-like forms, the framework of coral polyps and echinoderms, and the microscopic skeletons of some of the protozoans, form the bulk of limestone and other chemically similar deposits. Coquina, the Florida limestone, is composed of a mass of mollusk-shells; crinoidal limestones of the fragmentary skeletons of those marine forms so abundant during Palæozoic time. Coral limestones are formed by the building up of coral reefs and by the accumulation of fragmentary coral materials and finely divided coral muds, which may be distributed widely over the floor of the ocean by currents, forming compact calcareous rocks. Calcareous accumulations of this particular sort are considered to have been changed to dolomites by the action of the salts of magnesium in the sea-water, on carbonate of lime, replacing part of the calcium by magnesium and forming $(Ca,Mg)CO_3$ out of $CaCO_3$. This imperfectly understood process, by which limestones are changed to dolomites, is called dolomitization. Dolomites and limestones grade into each other and together are among the most common and important rocks of the lithosphere.

Chalk is an accumulation of minute calcareous shells secreted by the lowest forms of animal life, the protozoans, certain forms of which abound in the surface waters of the oceans. When they die their shells rain down through the water and accumulate on the floor of the high seas, forming oozes. The chalks are considered to have originated in a similar manner during past geologic time.

Chief among the accumulations of plant remains is peat, an accumulation of vegetable materials in swamps or moist places. It is a dark brown or blackish residuum left by the partial decomposition of mosses and other vegetable accumulations, not always made strictly in the water, but always in moist places, and usually in the waters of swamps. Similar vegetable accumulations on a most extensive scale have been formed during past geologic time, and now constitute beds of lignite and bituminous and anthracite coal. Diatomaceous or infusorial earth is a silt-like deposit consisting mostly of the microscopic silicious shells of that low order of plants called the *Diatomacea*.

Chemical Precipitates.—Briefly enumerated, these are salt and gypsum, found in alternating beds, and considered to have formed by the evaporation of salt lakes, or by the isolation and evaporation of bodies of sea-water. Calcareous sinter or tufa consists of carbonate of lime, which has been brought up in solution in the waters of hot springs and deposited as porous or cellular material about their vents. It is also deposited from solution in the waters of rivers and lakes, and occasionally forms deposits of considerable extent. Travertine is a more compact form of the same material, as is also Mexican onyx.

Eolian Rocks.—In regions unprotected by vegetation, as along sea-beaches, the shores of lakes, or in the region of deserts, the finer sands are picked up by winds and drifted like snow into oval or rounded hillocks called dunes. Often these drifting sands are a menace to agriculture, since they gradually encroach upon and bury under them, the arable land. Sands thus deposited by winds are only rudely stratified. In

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the same manner fine impalpable dust is transported long distances, and gradually accumulates to form loess. The loess deposits of China are locally over 1,000 feet thick. Similar accumulations occur in the United States, Europe, and in Argentina. The Mississippi Valley loesses are believed to have been laid down in water under unusual conditions. True loesses are unstratified, and have a characteristic vertical cleavage.

Glacial Deposits.—The great continental glaciers that, geologically speaking, existed only yesterday over a large portion of the continents of the northern hemisphere, left behind them vast amounts of characteristic material, which was in part deposited by the glaciers directly and in part by the waters resulting from the melting of the ice. These latter deposits are therefore partly of aqueous origin, and are called fluvio-glacial. Glacial drift is the general term applied to all the materials resulting from glacial action direct or indirect. Glacial till is the dense bluish clay, with numerous imbedded boulders, characteristically striated, formed underneath the glaciers (sub-glacial material). This till-sheet (or ground-moraine) is found over a large portion of the area covered originally by the glaciers, and varies in thickness from zero to hundreds of feet. Other sub-glacial accumulations are called drumlins, till-billows, till-tumuli, crag-and-tail, etc. Materials dumped down at the margins of the glaciers in confused heaps are termed moraines (terminal, lateral, or medial). Streams flowing within or underneath the glaciers deposited along their courses material (sand, gravel, clay), which remained behind after the melting of the glaciers in elongated ridges called eskers or osars. Where these streams issued at the margin of the ice-sheets they left irregular mounds called kames. Streams flowing on the surface of the ice would likewise accumulate materials of the same sort, which would remain after the melting of the ice as long serpentine ridges known as super-glacial kames or eskers. These floods of water escaping from the glaciers carried the gravels, sands, and silts far beyond the margins of the glaciers, and deposited them as deltas, fans, overwash aprons, and valley trains.

Metamorphic Rocks.—The processes of metamorphism have already been described as the result of the action of heat, pressure, and moisture upon deeply buried sediments. There are two kinds of metamorphism: contact, and regional. Contact metamorphism is produced by the heat of intruded masses of igneous material upon the surrounding rocks. The contact zone or area about the intrusion affected by its heat is usually narrow, but it may extend for rods or even miles from the intruded mass. The changes resulting from contact metamorphism are not so important in the production of altered rock-masses as they are in the formation of new minerals, so that they are of more especial importance to the mineralogist.

Regional metamorphism, on the other hand, as the name implies, has been exerted over wide areas, and has produced the most profound and far-reaching effects. By it the rocks over many thousands of square miles have been completely altered from their original condition. Sediments consisting originally of loose materials

have been reduced to a fluid, semi-fluid, or pasty condition by the combined action of heat, which has penetrated into them from the interior of the earth, moisture, which everywhere saturates the lithosphere to great depths, and pressure, which at the depth of only a few thousand feet is well-nigh inconceivable. The fluidity of rocks thus produced is more or less akin to the fluidity of true igneous magmas, but with an essential difference. In the case of metamorphism the fluidity is due to solution of the mineral substances in water (superheated perhaps); while in the case of magmas it is due to the solution of one mineral substance in another, water being present as an accessory constituent. To this, heat and pressure must be added, also the pressure, with consequent heat, which comes from the lateral or tangential thrusting-in of the crust of the earth upon itself, due to the slow shrinking of the earth under gravity. As a result of this pressure the older deeper-seated rocks (as well as some of the more recent ones) have been intensely folded, plicated, and sheared, which folding and shearing alone would be sufficient to alter them completely. Metamorphic rocks have other structures developed in them, such as crushing; jointing (series of more or less parallel cracks intersecting each other at nearly right angles and breaking the rock-masses into blocks with rudely parallel sides); faults (produced by the slipping of the walls of rock on either side of a fissure over each other); slaty cleavage (produced by great pressure exerted at right angles to the cleavage surfaces); fissility (the visible separation of rocks into thin laminæ, also due to pressure, and attended by slight movement of the laminæ on each other); schistosity or foliation (the property of splitting into plates with rough undulating surfaces, due to the parallel orientation of the mineral crystals). This may be cleavage, fissility, or both.

These structures are not confined to the metamorphic rocks, but are common to the sedimentary and igneous. They are more frequent, however, in the older rocks. The same processes of metamorphism, so potent in the transformation of true sediments, are just as efficacious in producing changes in the igneous rocks themselves, by virtue of which processes the igneous rocks frequently become so profoundly altered as to be utterly unrecognizable.

The metamorphic rocks as a class are holocrystalline, and in this respect resemble the igneous rocks of plutonic origin. Their chief varieties will now be considered.

Gneisses.—Disintegrated or residual granite consists of disaggregated particles of quartz and more or less thoroughly kaolinized feldspar, with considerable true clayey residue resulting from the complete decomposition of some of the feldspar, all somewhat tinged by the oxide of iron. It is easy to see how a similar assemblage of materials could be brought together upon a sea-beach. By a subsidence of the area and a continued deposition of other sedimentary materials above them, that first assemblage of sand and clay might become so deeply buried as to come within the sphere of metamorphic action. If reduced to a more or less fluid condition by heat, pressure, and moisture, and subsequently allowed again to solidify, it would crystallize out

as quartz, feldspar, and mica. In being so altered it would not necessarily have its original bedding-planes obliterated, and the rock would have the mineralogical composition of granite, but obviously would be of sedimentary origin. A metamorphic rock of such a character would be called gneiss. In the same manner a variety of mixtures might be altered with the same result. Conglomerates are known thus to pass by imperceptible gradations over into gneisses. An arkose might alter to gneiss. If the material originally contained much iron, then hornblende, or some other ferromagnesian mineral, such as biotite or augite, would result, and the rock would accordingly be called hornblende-, biotite- or augite-gneiss. Garnets might result from the metamorphism, and the gneiss would then be called garnetiferous. Fibrolite or cordierite might form, and the rock would be named accordingly.

Igneous rocks such as granites, syenites, or gabbros, by processes of metamorphism, may be altered into gneissic rocks. The chief metamorphic factor in the changing of igneous rocks to gneisses is, however, intense pressure, as a result of which even these most resistant of all rock-masses are made to flow like some viscous substance. This flowing, which is accompanied by more or less shearing, results in producing schistosity or foliation, which is accompanied by a distinct banding exactly simulating original bedding, so that the rocks lose their original massive form and come to resemble altered sediments. A granite in which this secondary banding or foliation had been produced would be called a granite-gneiss; a gabbro similarly altered would be termed a gabbro-gneiss, etc. In general we can say that a gneiss is any holocrystalline, foliated, metamorphic rock, of either sedimentary or igneous origin, which has the mineralogical composition of some one of the plutonic igneous rocks. It is frequently impossible to determine whether certain rocks are true sediments or altered igneous rocks.

Schists.—The term schist is applied to any holocrystalline metamorphic rock which, on account of the parallel arrangement of its crystal particles, tends to split more or less perfectly in parallel planes (schistosity or foliation). Clay upon metamorphosis yields mica. If little iron be present it furnishes muscovite (or sericite, its hydrated form), but if much iron be present it produces biotite. From this it follows that clay-beds on metamorphosis furnish mica of some sort or other, and as the rocks are always distinctly foliated, owing to the invariable parallel orientation of the mica-scales, they are called muscovite (or sericite) or biotite schists. Some quartz and feldspar may be present, but if subordinate they are still reckoned among the schists. Rocks of this character mark the transition of the schists into the gneisses. Staurolite, chialtolite, kyanite, stillmanite, albite, and garnet are of frequent occurrence among the mica-schists particularly, and in such cases the schists are designated staurolite or albite mica-schist, etc. Mica-schists range in granularity from coarse- to micro-crystalline, the micro-crystalline varieties being called slates; the finely crystalline intermediate forms, phyllites.

Quartz-schists are essentially quartz-rocks, which contained originally some disseminated

clay that altered to mica, as a result of the presence of which the rock has a schistosity. Many basic igneous rocks of the diabase order on metamorphosis change to hornblende-rocks. Where they are foliated they are called hornblende-schists. If more or less massive they are termed amphibolites. The diabases are very apt, however, to alter to chlorite schists, especially if the original augite was of the aluminous variety, and they may alter to biotite schists.

Other Metamorphic Varieties.—Pure quartz-sand metamorphoses to a holocrystalline rock called quartzite. Limestone metamorphoses to a more or less coarsely crystalline rock consisting of grains of calcite. If fine, even-granular, it is known as marble. If coarse-granular, it is called crystalline limestone or simply limestone. But the term marble is used to embrace all crystalline calcite rocks that are susceptible of a polish. Serpentine results from the metamorphosis of basic igneous rocks consisting largely of the non-aluminous varieties of hornblende or pyroxene and olivine. The peridotites are especially susceptible to this change. Anthracite coal results from the metamorphosis of bituminous coal, which in turn is derived from peat or lignite. In certain extreme cases of metamorphism anthracite becomes altered to a graphitic material.

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Rockstro, William Smith, English musical composer: b. North Cheam, Surrey, 5 Jan. 1823; d. London 2 July 1895. His first composition was a song 'Soon shall chilling fear assail thee.' In 1844 he studied under Sterndale Bennett and by his advice spent a year at the Leipzig Conservatorium. He was also one of seven specially selected pupils of Mendelssohn, and laid the foundation of his great theoretical knowledge under Hauptman. He edited a series of operas in vocal score, as 'The Standard Lyric Drama.' Rockstro ultimately concentrated his attention on musical archaeology, and his deep and practical knowledge of the ancient methods was fully shown in the 'Dictionary of Music and Musicians,' to which he contributed many articles. He also published a valuable 'General History of Music.'

Rockville, rök'vil, Conn., city in Tolland County; on the Hockanum River, and on the New York, N. H. & H. railroad; about 16 miles east-northeast of Hartford. Electric lines extend to Hartford, Ellington, and other nearby places. Nearby is Shenipsit Lake, of which Hockanum River is the outlet. The river has here a series of falls, making in all a descent of 280 feet, and furnishing Rockville with extensive water-power. The city was settled in 1716 by a colony from East Windsor, and was a part of the town of Vernon until 1889 when it was chartered as a city. There are about 20 manufacturing establishments of importance, chief of which are envelope factories, silk and woolen mills, gingham and satinet factories. The principal public buildings are the schools, churches, and the library. The latter cost over \$100,000. There are eight churches, a high school, public and parish schools, two private schools, and a public library. The government is administered by a board of alder-

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men, four members, and a council of eight members. Pop. (1910) 7,977.

Rockwell, Alphonso David, American physician: b. New Canaan, Conn., 18 May 1840. He was graduated at Kenyon College, and the College of Physicians and Surgeons in New York. He is a specialist in electro-therapeutics and neurology, having held a professorship in the former subject in the Post-Graduate School of Medicine and also in the New York State Women's Hospital. He was one of the three commissioners appointed to give advice on the establishment of the new method of execution by electricity adopted by the State of New York. He is the author of 'Relation of Electricity to Medicine and Surgery'; 'Nervous Exhaustion' (1901); and, with G. M. Beard, 'Treatise on the Medical and Surgical Uses of Electricity.'

Rockwood, Tenn., town in Roane County; on the Cincinnati, N. O. & T., the Rockwood & T. R., and the Tennessee Central R.R.'s; about 40 miles west-southwest of Knoxville, and 88 miles north by east of Chattanooga. It is in a coal region in which there are extensive deposits of iron ore. The chief industrial establishments are blast furnaces, foundries, machine shops, and coal yards. The trade is chiefly in coal and in iron products. Pop. (1890) 2,305; (1900) 2,899; (1910) 3,000.

Rocky Gap, Engagement at. On 5 Aug. 1863 Gen. W. W. Averell, with a brigade of cavalry and mounted infantry and a 6-gun battery, left Winchester, Va., for a raid into West Virginia, which was to be continued to Lewisburg and the Virginia & Tennessee railroad. He moved by way of Wardensville to Moorefield, and to the upper valley of the south branch of the Potomac, and then to Huntersville, driving back Col. W. L. Jackson's cavalry. As he approached White Sulphur Springs, on the morning of the 26th, he encountered Col. Geo. S. Patton, who, with four small organizations of infantry, two battalions of cavalry, and a battery, in all about 1,900 men and four guns, had been ordered to intercept him, and had taken position at Rocky Gap, the junction of the Huntersville road with the Lewisburg and Kanawha turnpike. Patton was strongly posted, and Averell opened upon him with artillery and disabled two of his guns; but successive charges by Averell's dismounted force, with efforts to flank him, continued during the entire day, failed to dislodge him, and at night, after nine hours' fighting, the contending forces occupied the same positions as in the morning. Averell intended to renew the fight next morning, but, learning that Patton had received reinforcements from Lewisburg, made arrangements to withdraw. At 10 A.M. Patton attacked his left and half an hour later Averell ordered a retreat, which was conducted in good order on the road to Warm Springs, and thence by way of Huntersville to Beverly, which was reached on 31 August. The Union loss was 25 killed, 125 wounded, and 67 missing, a total of 217; the Confederate loss was 20 killed, 129 wounded, and 13 missing, a total of 162.

E. A. CARMAN.

Rocky Mountain Goat, a goat-antelope (*Oreamnos montanus*), related to the chamois and serow, which inhabit the heights of the Rocky Mountains and Cascade Ranges between

the forests and the snow line, from the 44th to the 65th degree of latitude. It is about the size of a goat, but is stouter, handsomer and has stronger legs. It is completely covered with long, thick, white hair, which forms an erect mane along the middle of the back from between the horns to the root of the tail; the shoulders are rather humped, and the head is habitually carried low. Both sexes have slender, smooth, black horns, curving backward, about eight inches long and sharp-pointed. Its pure white coat is a capital protection against observation in the midst of the alpine snow, and is unique, as no other white ruminant is known. Dwelling in such solitudes they have little to fear from natural enemies, and fall an easy prey to the human hunter who has the hardihood to pursue them upon the rough mountain peaks, and skill enough to get near to them unobserved. "Their food," says Wister, "seems to be chiefly the short almost lichen-like moss that grows on the faces and at the base of the rocks, and between them in the crevices. . . . I am inclined to believe that the goat keeps consistently to the hills, whatever the season may be, and in this differs from the mountain sheep, as he differs in appearance, temperament and in all characteristics, except the predilection for the inclined plane; and in this habit he is more vertical than the sheep." A variety from the Copper River region, in Alaska, is marked by greater divergence of horns and some other structural characteristics, and has been called *O. kennedyi*. The flesh of the mountain goat is not very good, but its hair was utilized in weaving by the Indians of British Columbia and the coast northward; and its tanned hide has a value in market as a rug. Consult Stone and Crane, 'American Animals' (1902), and authorities on travel and sport in the Northwest.

Rocky Mountain Sheep. See BIGHORN; SHEEP, MOUNTAIN.

Rocky Mountain Subregion, a rather indefinite zoogeographical region embracing the elevated area occupied by the Rocky Mountains, which zoologically presents certain peculiarities very noticeable to a traveler from either the eastern lowlands or the Pacific coast. The resemblance in the fauna is, indeed, rather to the East than to the West, as the Rockies do not form a zoological "divide" to anything like the extent which the Sierra Nevada does, nor even as completely as does the line of deserts which occupy the great depression of Nevada and Idaho between the Wahsatch range and the Sierra Nevada.

A large number of species of animals and plants extend from the Mississippi Valley to and throughout the Rocky Mountains, in forms which are identical from one side of their wide range to the other, or which shade indistinguishably from one varietal extreme in the East to another in the West. On the other hand the plants and animals common to both California and Colorado are comparatively few. The dry and foodless deserts of the Utah basin form a more potent barrier than the snows and altitude of either Sierras or Rockies. Thus the buffalo formerly wandered throughout the whole network of interior valleys, and there is a special variety which seem never to have left the park-

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pastures and scantily timbered defiles; yet Bear River, Utah, on the border of the alkali basin, is the farthest west they ever got south of northern Idaho. The elk, grizzly and bighorn, the mountain goat, white ptarmigan and certain other examples of animals, are common to both the Sierra Nevada and the Rocky Mountain systems; but in all these cases they are species whose range extends far north where both lines of elevation converge in British Columbia. Yet the true "blacktail," or Columbian deer, is never shot east of the Cascades, nor does the Virginian, or willow deer, common enough in the Rockies, wander over to the Cascades or Sierras of Oregon and California.

To a more limited extent the Great Plains on the east serve as a barrier between the commingling of plants and animals indigenous to the mountains on the one hand and the Mississippi Valley on the other. And that this, as far as it goes, is a real barrier, is shown by the fact that many common weeds and trees, which flourish well in Colorado now, had never reached there until carried, either intentionally or accidentally by man; that is, the place was suitable enough to them, but they had never been able to reach it.

The Rockies, then, form a zoogeographical district, which embraces practically the whole system of complicated chains from New Mexico to the borders of Alaska, and there is a curious homogeneity throughout, a long list of insects, mollusks and animals of the lower classes, as well as of trees and herbs, occurring from the Rio Grande to the headwaters of the Saskatchewan, disregarding the difference in latitude, which in flat regions is the most powerful factor governing the distribution of animal and plant life.

This is not exceptionally the case in the Rocky Mountains alone, though here it is conspicuous and well-marked. It is true of the Ural-Carpathian system, of the Scandinavian ranges, of the Andes, of the great East-African system, of which Mounts Kilimanjaro, Kenia, and Gordon-Bennett are peaks; nor is it difficult of explanation. A great mountain-province is really a series of sub-provinces concentrically arranged, or, to put it in another way, heaped on top of one another, for the largest bound, embracing the whole extent of the mountains and their foothills, contains several more or less restricted areas, determined by altitude, just as a vast lowland province, such as the whole eastern half of the continent, contains several well-defined subdivisions according to zones of climate, succeeding one another from north to south. The cause of the natural division of these sub-provinces is precisely the same in both cases, for, whereas in the Mississippi Valley the cooler or warmer average temperature required by each animal or plant for its best development is obtained by moving to the north or to the south, so in a mountainous region too much cold or too much heat can be avoided by moving upward or downward, and climate varies with altitude instead of latitude.

Hence, naturalists who have studied the mountains are able to mark out successive sub-provinces, according to altitude, within the upper and lower borders of which certain forms of life are restricted, appearing neither below, or

above, a limited number of thousand feet, except as occasional wanderers. Botanists have long recognized this.

Of course the number of varieties steadily decreases as one ascends just as on approaching the poles, because the means of supporting life diminish in proportion as a moderate climate and abundant vegetation are left behind. The hardy grizzly can stray to the utmost heights, as he is fond of doing, for his strength, power of locomotion and fasting abilities make it possible; but even he cannot remain there long, since food is very scarce beyond the timber. The eagle and greater hawks may soar above the naked icy crest of the loftiest summits, or perch upon the pinnacles, but they seek their prey and build their nests for the most part at far lower levels. A few small birds, like certain semi-arctic warblers and sparrows (especially the gay *Leucosticte* finches) and one large one (the well-known ptarmigan), the little-chief hare or "cony," which stores in its rocky tunnels a winter larder of roots and stems gathered at the edge of the snow during the brief summer, and a small variety of beetles and other insects more or less subterranean in habits, alone brave the storms and famine involved in continuous residence upon the higher summits.

Next below lies the zone of hardy plants and of a longer list of animals, such as the Canada jay, dusky grouse, several hawks and owls, the kinglets, water-ouzel, snow-birds and *Zonotrichia* finches, the bighorn sheep, and a large variety of insects and snails. Below that, down among the pines and abundant shrubbery of the lower slopes and the foothills, one finds in summer the full measure of Rocky Mountain life.

An examination of these facts discloses that all the inhabitants of the lofty plateaus and the rocky peaks are arctic animals, and some of them, like the ptarmigan, turn white in winter in true arctic fashion. These creatures, finding the same conditions at those great heights to which they are accustomed at lower levels inside the polar circle, can live and flourish on an arctic island, as it were, in the midst of the temperate zone; the long narrow snow peaks of the great range forming a tongue of polar climate stretching half way to the equator. It has thus been possible for the beautiful white goat, whose proper home is in British Columbia, to stray south along the crest of the Sierra Nevada and Rockies as far as these high mountains run, but he must keep upon the very crest, whereas in Alaska he comes down to the shore. The insects and minute life of the peaks of Colorado belong to the same class with (are often identically the same species as) those collected by polar exploring expeditions. The same is true of plants. "Red snow" and arctic lichens may be gathered on Pike's Peak.

It is natural, then, that two different migratory movements should be observable in the Rocky Mountains; one the regular seasonal movement southward in the fall and back in the spring, affecting chiefly those birds that live at the base of the range, or near it; and another movement, which is regularly made by many animals, upward to the cooler and fresher pastures in the summer, and back to the less

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snowy and more sheltered dells near the base of the mountains as winter approaches. This vertical migration is very well understood in the case of the game, and the paths which the animals follow are often distinct.

The foregoing facts lead to an interesting generalization. While the southern peaks might be colonized by such stragglers from the north as the goat and the ptarmigan, whose legs or wings enable them to travel back and forth, there is a much longer list of small and practically stationary animals never found in the intervening valleys and totally unable to cross from one peak to another. Hence we must conclude that each lofty mountain top is a habitat by itself, entirely cut off from neighboring peaks where duplicates of its fauna and flora may be collected. On the tops of Mount Washington, in the White Mountains, and Mount Marcy, in the Adirondacks, are insects and cryptogamous plants which do not occur anywhere between these isolated fragments of polar climate and the arctic circle, where the same butterflies, spiders and lichens are widespread and indigenous.

How shall this isolation of strictly circumscribed faunas upon mountain peaks be explained? Clearly it dates back to a time when communication between them existed. The ice-cap which, during the last Glacial Epoch, gradually overspread a large part of the north temperate zone and in the Rocky Mountain region covered the whole extent of their highlands with a thick mantle of snow and filled every cañon with local glaciers, of course crowded southward all the surviving life which had been wont, during the warm Tertiary time, preceding this cold period, to dwell far toward the north.

But when the epoch was on the wane, and the ice-front began to retreat, the relieved earth was again clothed with vegetation and re-tenanted by cold-loving animal life, which advanced northward closely in the rear of the retreating glacier. At a greater distance followed the more delicate animals and plants, gradually spreading northward as the moderating climate permitted, until they had established themselves in isothermal zones as we now find them. But as a subsiding flood will leave, stranded upon the top of the first points to appear above the surface, the driftwood and wreck of the deluge, so, as the warmth of southerly regions at a low elevation has increased, certain colonies of the advance guard of the army of animals and plants have found themselves stranded upon frigid mountain tops—*islands of arctic climate*—isolated from their fellows by warm valleys and plains in which their kindred speedily disappeared, overcome in the battle for life by the greater increase of lowland species to whom the circumstances were more favorable; but here on the high cold peaks they have been able to keep a stronghold, each in its own in a limited area, though surrounded by utterly fatal conditions.

Consult authorities cited under ZOOGEOGRAPHY, especially the writings of C. Hart Merriam.

Rocky Mountain Trout. See DOLLY VARDEN TROUT.

Rocky Mountains, or Cordilleran System, the system of mountains which constitute the major axis of elevated lands of North America,

in the western part, extending from the Arctic Ocean on the north to South America on the south, and parallel with the Pacific coast. This great system of mountains is continued along the Pacific coast in South America under the name Andes Mountains (q.v.). Between the Rocky Mountains and the Andes is a pass in Panama not many feet above sea-level. The width of the system varies; the greatest breadth is in the United States, between lat. 38° and 42° N., where it is about 1,000 miles. The width diminishes north and south, increasing again in Mexico and diminishing only with the width of the continent. The highest point of the system is in Alaska, but the highest land mass is in the United States between 35° and 42° and on the eastern side of the system.

Ranges.—The ranges on the western boundary, and near the Pacific coast are the Cascade and Sierra Nevada in the United States, the Sierra Madre in Mexico and Central America. West of the Sierra Nevada, in California, is the Coast Range. The eastern chains in the United States, called the Rocky Mountain Range, extend north and northwest in the United States, approach nearer the Pacific in Canada, continuing into Alaska to the Arctic Ocean. On the east of the Rocky Mountain Range is the great central plain of the United States and Canada. Rising abruptly from this plain are many isolated cone-shaped peaks which gradually merge into ranges, forming an almost continuous eastern barrier, composed of short ranges, chief of which are Sangre de Cristo, Colorado or Front Range, Medicine Bow, Big Horn, and Laramie. Farther east, in South Dakota and Wyoming, are the Black Hills, a mountain mass detached from the main ranges. In Wyoming the ranges divide, some extending southeast, others southwest, and several short ranges having an almost east and west trend. Some of the well known interior ranges are Wahsatch, extending through Utah, and forming the eastern wall of the Great Basin, Wind River, Salmon River, San Miguel, and Beaver River. Bitter Root Mountains form the divide between the headwaters of the Colorado and the Missouri Rivers. In Nevada the short ranges are generally north and south, in the central and eastern part there are a large number of short, almost parallel chains. Other noted ranges are the Cœur d'Alene, the Lapwai, and the Blue. The ranges south of the divide in Wyoming have a greater altitude than those north; but some of the southern ranges after leaving Colorado on the south and east, end abruptly, and others slope gradually to the low desert plains. The greatest development is in Colorado.

Peaks.—In Colorado there are about forty peaks which are over 14,000 feet in height. Among them are Grays Peak, 14,341 feet in height; Longs Peak, 14,271 feet; Pikes Peak, 14,134 feet. In the Sawatch Range, in Colorado, are Mount Harvard, 14,375 feet, and Mount of the Holy Cross, 14,176 feet. In the mesa region in western Colorado is Uncompahgre Peak, 14,408 feet; and in Sangre de Cristo Range is Blanca Peak, 14,463 feet. Other famous peaks, outside of Colorado, are, in Wyoming, Fremont's Peak, 13,700 feet, in the Wind River Mountains; Mount Hayden, 13,691 feet, in the Sawatch Range. In the Colorado, or Front Range, there are four peaks over 14,000 feet;

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in Sawatch Range, 10 peaks; in the Sangre de Cristo, three; in the San Juan, four; in the Sierra Nevada, four. In Park Range (not group) and in the Pikes Peak Group, there is one in each. The highest peaks belong to the Cascade Range. Mount McKinley in Alaska, is, over 20,000 feet above sea level; Mount Logan is 19,500 feet; Mount Saint Elias, 18,101; Mount Rainier, 14,444. Many of the peaks of this vast system, especially in the Cascade Range, are extinct volcanoes. In Mexico and Central America there are a number of active volcanoes. Orizaba, 18,300 feet in height; Popocatepetl, 17,887; and Ixtaccihuatl, 17,343, are among the highest active volcanoes.

Plateaus.—The great plateau region included in the Rocky Mountain system is in southern Wyoming, eastern Utah, eastern Arizona, western New Mexico, and western Colorado. The lands in Colorado and New Mexico east of the mountain ranges belong to the Great Plain. The Plateau region is bounded on the north by Sweetwater and Wind River Mountains. The general elevation of the whole plateau is about 7,000 feet above sea-level, but in Colorado it has an elevation of 10,000 feet. The Continental divide crosses this plateau; and within its limits are the waters of the three great river systems of the United States, the Mississippi, the Colorado, and the Columbia. The southern part of the plateau has in places an abrupt ending, a steep, almost perpendicular escarpment. The ranges crossing, divide the plateau region into sections to which have been given the names Kaibab, Kaiparowits, Aquarius, Colorado, Markagunt, Paunsagunt, Paria, Shiwits, Tavaputs, Uinkaret, and others not so well defined as those named. On these broad plateaus are groups of mountains, buttes, and isolated ranges and peaks. There are seven peaks over 13,000 feet above sea-level; five over 12,000 feet and less than 13,000 feet; and 20 over 10,000 feet and less than 12,000 feet.

Parks.—The Parks of Colorado are high mountain valleys, known as North, Middle, South, and San Luis, with an elevation of from 6,000 to 10,000 feet, surrounded by ranges of mountains from 3,000 to 4,000 feet higher. The west border of the San Luis Park is formed by San Juan Range, with its high peaks, more than 100 of them over 13,000 feet, bordering it like giant watch towers. The Uintah Range is west of North Park. The Parks, or enclosed mountain valleys in Idaho and Wyoming, are not so high as the Parks of Colorado. The most famous park in the whole Rocky Mountain System is Yellowstone Park (q.v.) in Wyoming, now a Government Reservation. The ranges on the boundaries of the Parks and rising from the Park Valleys, are grouped together as the Park Ranges or Park System. The mountains so designated are bounded on the north by the Laramie Plains, and on the east by the Great Plains. The southern and western boundaries are indefinite. Other noted parks are Monumental Park and the Garden of the Gods, near Colorado Springs. The 500 acres are covered with an extraordinary rock formation, like giant spires and pillars, and some like vast cathedrals. The Yosemite Valley (q.v.) is often classed with the Parks.

Desert Region.—Within the area called by this name are vast arid regions, bare bleak

mountains, and localities of almost barren lands, some of which might be made fertile by irrigation, and some fertile valleys. It includes the southern parts of Idaho and Oregon, the western parts of Utah and Nevada, the southeastern part of California, the southwestern part of New Mexico, the southern part of Arizona, and the north central part of Mexico. The Sierra Nevada and Cascade ranges are on the western boundary; and the plateau drained by the Colorado River is on the eastern boundary. The greater part of this region is known as the Great Basin (q.v.) which has no apparent outlets to the ocean. The ranges, as in Nevada, are simple and narrow and separated by broad, level desert valleys.

Passes.—Several depressions in the ranges are called Passes, and some have been used for routes for railroads. A famous pass is the Lewis and Clark's, in latitude 47°. Through this pass the Northern Pacific railroad has been built, and at Mullan's Pass it goes through a tunnel 3,850 feet long. The Truckee Pass, 6,000 feet above sea-level; the South Pass of the Wind River Range, Evan's Pass in the Front Range, which is crossed by the Union Pacific railroad, are all well known. In Canada the pass between Mount Hooker and Mount Brown, Athabasca Portage, is 7,300 feet above the sea. In the California mountains there are a number of passes. Where the rivers have cut their channels through the mountains, passes have been formed.

Lakes, Rivers; and Glaciers.—The greatest rainfall is on the western slope, where the moisture brought by the winds from the Pacific Ocean falls. In the valleys and on the plateaus, especially where the waters fall down the escarpments, the rivers run through deep cañons, the almost perpendicular sides of which are thousands of feet above the river beds. The rivers of the plateaus have their sources in the Park and Wind River Mountains, and in the Wahsatch Range. They have carved out deep gorges, which divide the region into a series of distinct plateaus. Some of the famous cañons of this region are the Grand of the Colorado, the Kanab, and the Marble. The principal rivers within this region are the Green, Colorado, Sevier, Paria, Uintah, and White. The rivers whose head-waters are in the Sierra Nevada Range, flow to the Pacific, except a few, which flow east and are lost in the sands. The Sacramento and the San Joaquin are in the valley between the Sierra Nevada and the Coast Range. The one river comes from the north, the other from the south, almost parallel with the ranges until they unite, when they burst through the mountains and discharge their united waters into the Pacific Ocean. The Columbia is one of the great rivers of this region. Rising on the east side of the Cascade Mountains it flows south for some distance until finally it plunges through the mountains in a series of magnificent cascades, whence the name of the range. The Front Range in northern Montana bears upon its crest for many miles the continental divide which separates the headwaters of the Missouri and the Columbia rivers. The Bitter Root Range separates the Missouri from the Salmon. The greatest water systems of North America have head-waters in the Rocky Mountains. The Colorado toward

ROCKY MOUNTAINS

the south, the Yukon on the north, and the Columbia are the largest streams that flow toward the Pacific; the Mississippi, the Great Lakes and the Saint Lawrence, and the streams that flow into the Hudson Bay all reach the Atlantic Ocean; and the Mackenzie and its tributaries flow into the Arctic. The Rocky Mountains have many small lakes, formed by springs, and depressions which serve as basins. In the Great Basin are several bodies of salt water, the largest of which is Salt Lake (q.v.). The only crater lake in the United States is Crater Lake in the National Park. The glaciers of the Rocky Mountains are numerous. In Alaska are the largest and greatest numbers among which are Muir, and Malaspina. Mount Rainier (q.v.) has over 30 glaciers, extending over a space of 100 square miles, and some of the ice walls reach a depth of 1,000 feet. The Puyallup and Mowich rivers drain five of the largest glacier rivers of Mount Rainier. A notable feature of these rivers is what is known as glacial tides, which are quite marked in summer time. Between midday and a few hours before sunset, there is an increase in the flow of water at the head of each river; about two feet in the narrowest part of the rivers. The plan is already under way to construct a dam in Puyallup River at a point 1,900 feet above tide-water, and 35 miles from Tacoma, from which the water will be carried by a power canal to a point 10½ miles below, to be precipitated into a large power house in the cañon. The power generated will be transmitted to Tacoma, Seattle, and other places. The vastness of Mount Rainier may be conceived when it is known that the surface, including the hill country at its base, has an area of 3,000 square miles, and scientists who have examined the mountain say it has the greatest ice covering of any elevation on the Western Hemisphere. In other parts of the Rocky Mountains are found vast glaciers, and many of the peaks are ever whitecapped with snow.

Geology.—The name "Rocky" Mountains is most appropriate to this vast elevation, for in the mountain range, on the plateaus and in the high valley are numberless naked rocks, such as are found nowhere else in America. The aridity of a large portion of the region prevents the growth of vegetation. Across the plateaus are long lines of cliffs, the sides seamed and carved, the debris accumulating at the base. The greater part of this region has been the scene of great volcanic action. The lava, ashes, and scoria are plainly visible. All the mountains of the Desert Ranges are somewhat similar,—a monoclinical ridge of displacement—a fault (q.v.) on one side and a flexure on the other. The strata, generally, dips one way, the escarped edges of the strata form the front or surface of the ridge. Secondary faults and flexures appear in many places. Granites, sandstones, limestones, and schists are found in many of the ranges of this region. The present arrangement of the mountains is not of ancient date, although this region, since Jurassic time, has been above the sea. The eastern ranges are composed of Mesozoic, Palæozoic, and Tertiary sediments, schists, and granites. The present formation is of the Tertiary period; but the irregularities and unconformities show that this section had alternate periods of sea sub-

mergence and of dry lands. The plateaus are separated, by faults and flexures, into blocks. The buttes have horizontal strata and escarped sides. Some of the plateau mountains had their origin in upheaval, and others are of simple anticlinal structure. The Uintah Range, on the north, has an east and west axis, and is the result of upheaval. The Zuni Range, on the south, is of the same type. Like other adjacent regions this shows alternating sea submergence and dry periods, but the plateaus, since the Cretaceous period, have been above water. During the early Tertiary and the late Mesozoic time the basin region was dry, but the plateaus had large lakes and seas. The present "block arrangement" of the plateaus began in the early Tertiary period. The plateaus are composed of the Mesozoic, Palæozoic, and Tertiary sediments. In some of the deep cañons are found granites and crystalline schists. The Sierra Nevada Range bears the marks of recent volcanic action. In the vicinity of Mount Shasta and Lassen Peak are volcanic masses, and on the west slope are vast sheets of lava. The Coast Range has the Appalachian type. The upheaval of this region began in the later Tertiary period; the ranges are made up of oppressed folds of strata, worn down by rains and rivers; the summits are tipped westward. The Cascade Range contains a number of extinct volcanoes. In Canada there are in the region of this range a number of volcanic plateaus. The whole Rocky Mountain area bears the marks of volcanic action. Much is known of the gigantic formations in this region, and the general geological features; but the scientific study of this vast section is in its infancy.

Minerals and Mining.—The Rocky Mountain section is the great treasure region of North America. Almost all the precious and useful minerals are found here in abundance. Gold had been discovered and used by the aborigines, and deserted mines have been found where mining had been carried on in a crude way as early as 1680. Gold exists in nearly all the ranges of the system. Gravel containing coarse gold is found from 20 to 60 and even 100 feet below the surface. Abandoned gold fields were worked over with great profit during the last decade of the 19th century, by using improved methods. There are rich deposits of silver, copper, iron, salt, coal, lead, and in the southwestern part of the United States, petroleum and gas. The placer gold regions in Alaska, and the gold fields of the same territory, have been found thus far (1904) of great extent and value. The value of the fine building stone, the fire-clay, gypsum, all kinds of cement material, are rarely taken into consideration because overshadowed by the value of the gold, silver and copper. The gypsum beds in the northwestern part of Texas and along the foot-hills of the ranges in southern Colorado are of great extent and value. (See separate States and Territories of the United States in the Rocky Mountain region, Canada, and Mexico for more details on MINING and MINERALS.)

Climate.—The west slope of the Rocky Mountains, or all that portion which faces the Pacific Ocean, has a milder climate than the central or eastern part of North America in the same latitude. The warm winds from the Pacific Ocean bring heat and moisture. The

rainfall is copious on the western side of the mountains. Like the mountain regions on all parts of the globe, the temperature lowers with increase of altitude, and the winds which here blow over the cold mountain tops and across the plateau region to the eastern slope carry with them neither heat nor moisture. In the southeastern part of this vast region where the mountains become low ranges or foot-hills, in the United States, west of the ranges that parallel the coast, the climate is hot in summer and mild in winter; in the Great Basin region and on the eastern slope of the mountains, extending out on the Great Plains, the climate is marked by aridity. (See UNITED STATES.)

Flora.—The great aridity of the region east of the western or coast barrier prevents the growth of vegetation. The surface is exposed to erosive action which is specially rapid at such great elevations, and the denudation becomes more complete as the sand and small disintegrated fragments are swept away by the winds, thus giving no opportunity for the accumulation of soil. A large portion of the central and eastern mountain region, and the western part of the Great Plains require irrigation in order to have vegetation; this is so even in the parts where there is abundant fertile soil. The arid portion of the United States, exclusive of Alaska, is about two fifths of the whole area. The redemption of the arid lands is one of the Nation's problems. Less than 10 per cent of the mountain region is forest-clad; but a larger proportion is covered with verdure, including the portions covered with dwarfed herbage, sage brush, and stunted cedars and pines, most of which is useful for fuel but not for building purposes. Crops that mature in a short season and pasturage grasses are found on the foot-hills and valleys, especially along the streams. In some places where a little moisture is carried over the passes, below the snow line, the mountains are covered with the dark evergreen growth of hemlock, spruce, balsam fir, and tall pines; and still further down are interspersed among them the birch, beech, cherry, and various other trees, while along the streams are found groves of cottonwood and willow. Over large districts, however, the forest growth is often exceedingly sparse, and even the grass that covers the plains, and upon which travelers depend for the sustenance for their animals, is parched and disappears in the long droughts to which these regions so remote from the sea are subject. In the sandy regions along the North Fork of the Platte River above Laramie River an extraordinary growth of artemisias and other odoriferous plants is found. They abound in the river bottoms and on the hills, growing to the height of two and three feet, in tough, twisted, wiry clumps. A multitude of flowering plants abound in this region, among which prevail several of *helianthus* (sunflower), and in the month of September, when they are mostly in bloom, the whole country resembles a vast garden. On the western slope may be found some of the largest trees in the world, many of them over 2,000 years old. The vast forests of the Northwest yield enormous quantities of timber. Not only is there a great variety and amount of plant life, but the vegetation attains a remarkable size. The shrub of the Atlantic region becomes a tall tree on the

Pacific Slope. Like the mountains themselves, the vegetation which covers the western slope is large, massive, dense, and in every way, seems patterned on a gigantic scale. (See CALIFORNIA, *Flora*.)

Fauna.—See UNITED STATES

History.—The natural history of a region is told by the geology and physical geography. This region is not as old as the Appalachian. The form of the peaks and the irregular surface of the slopes differ. The missionary explorers visited the mountainous sections of Mexico and the southwestern part of the United States in the 17th century, but the 'Relations of the Franciscans' have as yet (1904) been only partially translated. A large part of our knowledge of this section came first from the reports of the Government explorations made by Lewis and Clark, in 1804. Other explorations were made by Harmann, Long, Schoolcraft, Bonneville, Nicollet, and Frémont (q.v.). Since 1844 more than 20 expeditions have been engaged in exploring these wild regions, nearly all of them for the United States Government. Since the bill and appropriations of March 1853, the object of most of them has been the determination of the most practicable route for a railroad from the valley of the Mississippi to the Pacific. The history of the railroads across these mountains is largely a history of this region. The story of the strange, weird people called Cliff Dwellers (q.v.) is a most interesting chapter in the history of the efforts of man to use this region for a home. At present the population of this whole section is small. A large portion has less than two inhabitants to the square mile. About one tenth of the whole Rocky Mountain area in the United States has from two to six inhabitants to the square mile; in some places in California, Oregon, and Washington there are from six to eight; near the cities from 18 to 45, and in the San Francisco section, from 45 to 90.

Bibliography.—Reports by the U. S. Geological Survey; Bulletin No. 213 by the U. S. Geological Survey on 'Placer Gold Mining in Alaska in 1902'; 'Mineral Deposits of Bitter Root Range and Clearwater Mountains of Montana'; 'Ore Deposits of Butte, Montana'; 'Wonderland,' an annual issued by the Northern Pacific Railroad; De Nadailla, 'Prehistoric Americans,' for Cliff Dwellers; Lumboltz, 'Unknown Mexico' (1903); Day, 'Mineral Resources of the United States'; Dana, 'Geology'; Thwaites, 'A Brief History of Rocky Mountain Exploration' (1904).

Rococo, rō-kō'kō, or **Rocaille**, rō-kāl-ē', in architecture a name given to the very debased style and decoration which succeeded the first revival of Italian architecture. It is ornamental design run mad, without principle or taste. The ornament consists of panels with their moldings broken or curved at the angles, and filled with leafage, shell-work, musical instruments, marks, etc. This style prevailed in Germany and Belgium during the 18th century and in France from the time of Henry IV. to the Revolution.

Rod, rōd, **Edouard**, Swiss author: b. Nyon, Canton Vaud, 31 March 1857; d. 29 Jan. 1910. He studied at Lausanne and Berlin, became editor of the *Revue Contemporaine* at Paris, succeeded Monnier in the chair of comparative literature at Geneva, but subsequently

returned to Paris, and became a collaborator on the *Correspondent*, the *Revue des Deux Mondes*, and other periodicals. Among his works are: 'La Course à la Morte' (1886); 'Les Trois Cœurs' (1890); 'Le Silence' (1894); 'Scenes de la Vie Suisse' (1896); 'Au Milieu du Chemin' (1900); 'Dante' (1891); 'Stendhal' (1892); and 'Essais sur Goethe' (1898). Rod has visited the United States as lecturer before the Cercle Français de l'Harvard.

Rod, called also a pole, or perch, a measure of length, equivalent to $5\frac{1}{4}$ yards, or $16\frac{1}{2}$ feet. See **PERCH**; **WEIGHTS AND MEASURES**.

Rodakowski, rō-dā-kōv'skē, **Henryk**, Polish artist: b. Lemberg 1823. He studied art in Paris under Cogniet and finally settled there. His works consist of historical pieces, genre, and portraits, the latest being the best. He received medals in 1852 and 1855 and was made chevalier of the Legion of Honor in 1861. He painted the portraits of Gen. Dembinski (1852); Artist's Mother (1853); Prince Saieha; Count Raczyński (1859). Among his historical pieces are 'Sigismund Sanctioning Privileges of Nobility' (1872); 'War Without Fight'; 'Galician Peasants at Church' (1857); 'Battle near Choczyn in 1673'; 'King Sobieski Receiving Envoy from Vienna' (1861).

Rodbertus, Johann Karl, yō'hān kārl rōd-bēr'toos, German political economist: b. Griefswald 12 Aug. 1805; d. Jagetzow 6 Dec. 1875. In 1829-32 he was in the Prussian civil service. In 1848 he entered his brief political career, as a member of the Prussian national assembly. Then he was for a fortnight minister of education, and in January, 1849, entered the second chamber from Berlin. Rodbertus was the real founder of scientific socialism in Germany. In contradistinction to Marx (q.v.), above whom he is placed by many modern economists, he was not international nor material in his views, but a nationalist and idealist, and expected social questions to be solved by legal methods. Prof. Wagner has called him "the most distinguished theorist of the purely economic side of scientific socialism." He wrote several works in connection with his propaganda. Consult the lives by Dietzel (1886-7) and Jentsch (1899).

Rodd, Sir James Rennell, English diplomat and poet: b. 9 Nov. 1855. He was educated at Haileybury College and Oxford University, and entered the diplomatic service as attaché in 1883. He was attaché at Berlin in 1884, and at Athens in 1888, 2d secretary to Rome in 1891 and to Paris in 1892, secretary of legation at Cairo 1894-1901, and secretary of the English Embassy at Rome from 1901. In prose he has published 'Frederick: Emperor and Crown Prince'; 'Customs and Lore of Modern Greece'; and in verse 'Poems in Many Lands'; 'Feda and Other Poems'; 'The Unknown Madonna'; 'The Violet Crown'; 'Ballads of the Fleet.'

Rodenberg, rō'dēn-bērg, **Julius**, German poet: b. Rodenberg, Hesse-Nassau, 26 June 1831. He came of a Jewish family of the name of Levy, but adopted the name of his birthplace for his own. He was educated at the universities of Heidelberg, Göttingen, and Berlin, afterward devoting himself to literature and traveling, and since 1874 has been editor of the 'Deutsche Rundschau.' His publications include: 'Jour-

nalistic Life in London' (1859); 'Pictures of Berlin Life' (1885-8); fiction, 'The New Deluge' (1865); 'The Grandidier' (1878); etc.

Rodenbough, rō'dēn-bow, **Theophilus Francis**, American army officer: b. Easton, Pa., 5 Nov. 1838. He was educated at Lafayette College, and in 1861 was appointed second lieutenant in the United States army. In the peninsular campaign of 1862 he was captured at Manassas, but was soon exchanged, and at the battle of Gettysburg was in command of a regiment. He was engaged at Winchester, losing an arm in that battle, and was brevetted major for his bravery. In 1865 he was brevetted brigadier-general of volunteers, mustered out of the volunteer service, and was appointed major in the regular army. In 1870 he was retired with full rank as colonel. He was secretary of the Military Service Institution in 1879, its vice-president in 1890-1, assistant inspector-general of New York in 1880-3, and in 1890-1901 chief of the bureau of elections in New York. He has written: 'From Everglade to Cañon with the Second Dragoons' (1875); 'Afghanistan and the Anglo-Russian Dispute' (1886); 'Uncle Sam's Medal of Honor' (1887); 'Sabre and Bayonet' (1897); etc.

Roden'tia, or **Glires**, an extensive order of Mammalia, represented by such forms as mice, beavers, porcupines, squirrels, rabbits, lemmings, etc. Of the characteristics tooth structures are the most important. The canines are always absent and the incisors large and chisel-like, and, with the exception of the *Leporidae*, which have four in the upper jaw, never more than a single pair in each jaw. These teeth consist each of a front layer of hard enamel and a posterior part of softer dentine, which ensures a persistent sharp edge, since the more rapid wearing of the softer dentine leaves the harder enamel of the front surface as a chisel-like edge. These teeth continue to grow from persistent pulps throughout life. The incisors are long and curved, and each forms a segment of a circle. Between the incisors and the molar teeth a wide interval exists. The molars are few, and their crowns may exhibit a variously laminated or tuberculate pattern. This structure of the molars has relation to the motion of the jaws in gnawing, the jaws being so articulated by narrow condyles fitting in longitudinal grooves that they slide backward and forward instead of moving vertically, as in most other animals. The transverse ridges of the molar teeth act therefore in opposition to this sliding motion of the jaws. The molars in some cases (as in the beavers) also grow from persistent pulps and possess undivided fangs. There is always a succession of milk and permanent dentitions. The chief chewing muscle is the masseter, which is greatly developed, while the temporal muscle is small.

The usual number of toes is five on both feet, but the pollex may be rudimentary or absent, and in the hind feet the number may be reduced to four, as in the hares, or to three, as in the agouti, jerboa, etc. Generally they are all clawed, but sometimes, as in the capybara, have hoof-like terminations. The scapula is narrow and remarkable for the long acromion process, and the clavicles are generally well developed, but may be imperfect or absent, as in the hares and guinea-pig. The femur generally possesses

a third trochanter, and the tibia and fibula are distinct or, as in the rats and hares, united. The beaver has the hind feet webbed, to adapt it for its semi-aquatic life. Some rodents have the hind legs of extreme length, as the jerboas. Usually a more or less complete hairy screen extends across the mouth at the narrow region of the palate behind the incisor teeth, thus preventing the entrance into the hinder portion of the mouth of the chips or dust that result from gnawing operations. Many rodents are provided with cheek-pouches for carrying food; usually these open within the mouth, but in the *Geomyidae* they open externally.

The stomach, generally a simple structure, may in some forms, as the lemmings, become quite complex, and its anterior portion as in beavers, may be provided with glandular appendages. This same portion in the dormouse is glandular and dilated so as to resemble the proventriculus or digestive stomach of birds. A large sacculated cæcum generally exists, and the intestine is usually very long. A gall-bladder is sometimes wanting. The surfaces of the cerebral hemispheres are smooth or destitute of convolutions, and, when viewed from above, the cerebellum is seen to be in great part uncovered by the cerebrum. The corpus callosum is well developed. The penis is usually retractile and contains a bone, and the testes normally remain in the abdomen, but descend periodically into the groin at the breeding seasons. The uterus is frequently completely divided into two cornua or horns, each of which opens separately into the vagina. In others the two cornua unite to form a single uterus or womb. The placenta is of the deciduate type, and of discoid form. Rodents are extremely prolific. Most species of rodents have characteristic and penetrating odors which arise from scent glands variously located in the vicinity of the anus. The skin, generally covered with hair, is spiny in the porcupines (q.v.), some genera of which group possess prehensile tails. Many of these animals furnish furs of value in commerce.

Extent and Classification.—This is by far the largest order of mammals, comprising more than 2,000 species. Rodents are found in all parts of the world, but are poorly represented in the Australian region and on Madagascar, and are altogether absent from certain oceanic islands. In South America they reach their maximum development. With a very few exceptions, such as the house-rats and the muskrat, they are exclusively herbivorous, and different species subsist upon grains, nuts, bark, roots, herbage, etc. Notwithstanding their great structural similarity the rodents have fitted themselves to the most varied environmental conditions, and present many remarkable adaptations and interesting habits. Most of them are terrestrial; many, like the mole-rats, rabbits, and prairie marmots, are burrowers; some, as the beaver and muskrat, are aquatic; many squirrels and others are arboreal. They run, leap, climb, or, like the flying squirrels and *Anomalurus*, sail through the air on skinny parachutes. Some, as the woodchuck, are solitary; many are gregarious, like the rats and mice, colonial like the rabbit and prairie marmot, or even, like the beaver, form co-operative societies and exhibit wonderful building instincts. Migratory movements of large parties of rodents are not infrequent, the most remarkable of which

are the well-known migrations of the lemmings. Although generally of small size, the rodents have gained a dominance both of species and individuals through their great fecundity and their ability to gnaw out a living beyond the reach of most animals. Their wariness and secretiveness have aided no little toward their preservation, though they form the chief subsistence of a host of snakes, birds of prey, and small carnivorous mammals. Human interests are affected by these animals in a variety of ways. Some of them furnish food, furs, or sport, others are interesting pets, but the great majority are injurious to agricultural interests. No less than 400 species and many additional subspecies have been described as occurring within the limits of North America, the great majority being mice.

The following is a modern classification of the order, though some mammalogists recognize a larger number of families:

GROUP SIMPLICIDENTATA.—There is a single pair of upper incisors with the enamel layer confined to the anterior surface; the fibula does not articulate with the calcaneum. Three sub-orders:

I. *Hystricomorpha*, or porcupine-like rodents: tibia and fibula distinct, alveolus of lower incisor ending on the medial side of the ramus of the lower jaw, only one premolar in each jaw. Families: *Octodontidae*, containing the coypu and many others chiefly of South America, but a few in Africa; *Hystricidae*, the porcupines; *Chinchillidae*, chinchillas of South America; *Dasyproctidae*, agoutis, etc., of South America; *Dinomyidae*, containing a single generalized rodent of Peru; *Caviidae*, the cavies or guinea-pigs and capybara of South America.

II. *Sciuromorpha*, or squirrel-like rodents: tibia and fibula distinct from each other, the alveolus of the lower incisor penetrating the ramus of the lower jaw and the premolars one or two on each side above and one on each side below. Families: *Sciuridae*, the squirrels and marmots, found throughout the world except Australia; *Anomaluridae*, peculiar squirrel-like animals with extensive parachutes along the sides, found in tropical Africa; *Haplodontidae*, *Haplodon*, of the Rocky Mountains; *Castoridae*, the beavers, of the northern hemisphere.

III. *Myomorpha*, or rat-like rodents: tibia and fibula coalesced, lower incisors as in the squirrels, premolars 3 to 4. Families: *Dipodidae*, jumping mice, jerboas, etc., North America, Europe, Asia, and Africa; *Muridae*, the rats and mice, a very extensive and cosmopolitan group which is variously subdivided; *Myosidae*, dormouse of Europe and other Old World forms; *Geomyidae*, pouched gophers and pouched mice of America; *Lophiomyidae*, a remarkable arboreal African form; *Spalacidae*, the mole rats and their allies of the Old World.

GROUP DUPLICIDENTATA.—Besides the large incisors, the enamel covering of which extends all around, there is a second pair in the upper jaw; the fibula articulates, with the calcaneum and the ankle and elbow joints are tongued and grooved; tibia and fibula co-ossified. One sub-order: *Lagomorpha*, hare-like rodents, with two families: *Leporidae*, hares and rabbits, cosmopolitan; *Lagomyidae*, picas or whistling hares, North America and Europe.

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Fossil Rodentia.—Rodent remains first occur in a fossil state in the Eocene Period, in which remains of forms allied to the dormice, porcupines, and squirrels exist. In Pliocene and post-Pliocene formations they become tolerably plentiful. Of the post-Tertiary forms, *Trogontherium*, or the great beaver, found in European deposits, is a familiar species, and the cave beaver (*Castor spelæus*) is also a notable form. *Trogontherium* may possibly have survived the human period. The hares and rabbits first occur as fossils in Lower Miocene of North America and Pliocene of Europe, and the rats and mice are found in Eocene, Miocene, and Pliocene formations. The guinea-pigs are chiefly Pleistocene, their remains occurring in the Brazilian bone caves of that age. Some of the extinct rodents were as large as an ox. Very little light has been thrown on the origin of the order by a study of the fossil forms, though Professor Cope believed the Tillodonts to be their ancestors.

Bibliography.—Consult the articles in this work on the various animals included in the order, and the following: Coues and Allen, 'Monographs of North American Rodentia,' United States Geological Survey of Territories (Washington 1877); Elliot, 'Synopsis of the Mammals of North America,' Field Columbian Museum (Chicago 1901); Beddard, 'Mammals' (London 1902); Alton, 'On the Classification of the Order Glires,' Proc. Zoological Society (London 1876); Woodward, 'Vertebrate Paleontology' (Cambridge 1898); and numerous papers by Merriam, Miller, Palmer, and others in the 'Bulletins' of the Biological Survey of the United States Department of Agriculture.

Roderick, rōd'ér-ik (Spanish, RODRIGO), last king of the West Goths in Spain. In 710 he was chosen king. Shortly after the Moors, under Muza, invaded Spain. Roderick met the invaders on the banks of the Guadelete in 711, but was defeated, and perished in the battle. Some accounts declare that he maintained resistance for two years longer. He is the hero of Scott's 'Vision of Don Roderick' (1811) and Southey's 'Roderick the Goth' (1814). Consult: Toulhan, 'Chronique Rimée des Derniers Rois de Tolède' (1885); Dozy, 'Geschichte der Mauren in Spanien' (1874); Saavedra, 'Estudio sobre la invasion de los Arabes' (1895).

Rodgers, rōj'érz, Christopher Raymond Perry, American naval officer: b. Brooklyn, N. Y., 14 Nov. 1819; d. Washington, D. C., 8 Jan. 1892. He entered the United States navy as a midshipman in 1833, commanded the schooner Phoenix in the Seminole war in 1840-1, was engaged in blockading service in the Mexican War, and served in the trenches at Vera Cruz and at the capture of Tobasco and Tuspan. He was commissioned commander in 1861, was fleet-captain at the Battle of Port Royal, and also in the attack on the defenses of Charleston in 1863. He was then appointed to command the steam sloop Iroquois and was engaged in special service until the close of the War. He became commodore in 1870, and in 1874 received rank as rear-admiral. He was superintendent of the Naval Academy in 1874-7, in command of the naval forces in the Pacific in 1878-80, and from then until his retirement in 1881 was again superintendent at the academy. He presided

over the convention held in Washington in 1885 for fixing a prime meridian and universal day.

Rodgers, John, American naval officer: b. Harford County, Md., 11 July 1771; d. Philadelphia 1 Aug. 1838. He entered the naval service in 1789, and in 1798, as lieutenant and executive officer of the frigate Constellation, captured a French vessel, for which service he was promoted captain in 1799. In 1802 he was appointed to the Mediterranean squadron then engaged in the war with Tripoli, in the success of which he was largely instrumental. He succeeded Commodore Barron in the command of the squadron in 1805, and in this office rendered a valuable diplomatic service in securing treaties from Tripoli and Tunis which established the friendly relations since existing between those countries and the United States. In 1812 Commodore Rodgers, in command of the Atlantic Squadron, was the first to fire upon the British, and during the campaign captured some 23 English vessels. He was president of the Board of Naval Commissioners 1815-37, except during the three years 1824-7, when he was again in command of the Mediterranean Squadron.

Rodgers, John, American naval officer, son of the preceding: b. Harford County, Md., 8 Aug. 1812; d. Washington, D. C., 5 May 1882. He was commissioned lieutenant in 1840, and was engaged in the hostilities with the Seminoles from 1840 to 1843. Subsequently he performed a valuable service in surveying the Florida coast. His explorations from 1852 to 1861 in the North Pacific and China seas, and in the Arctic Ocean were also of much scientific and commercial importance. As commander of the monitors Weehawken, Dictator, and Monadnock he took a prominent part in the Civil War. He was made commodore in 1863, and in 1869 commissioned rear-admiral in command of the Asiatic fleet. In this office he rendered valuable service as a diplomat by establishing the safety of American commerce in Korea. At his death he was superintendent of the naval observatory at Washington.

Rodin, rō-dān, Auguste, French sculptor: b. Paris November 1840. After working in a subordinate position in several studios he exhibited for the first time in the Salon in 1875, and since then became well known as a sculptor utterly beyond the control of classical convention, and reveling in the first expression of emotion and action, yet showing a power of execution worthy of the best Renaissance art. His statue of Balzac, ordered by the government, was so palpably an attempt to suggest by a plastic achievement something beyond the range of sculptural expression, that it was rejected when exhibited as a cast. Yet he has done some remarkable work, as for instance 'The Brazen Age,' exhibited as a cast, and after much discussion executed in bronze for the Luxembourg Gardens. Among other rugged and fantastic creations are 'Burghers of Calais'; 'The Kiss.' He has made busts of Bastien-Lepage, Victor Hugo, Henri Rochefort, and Jules Daloux, the sculptor.

Rodman, rōd'man, Isaac Peace, American soldier: b. South Kingston, R. I., 18 Aug. 1822; d. Sharpsburg, Md., 30 Sept. 1862. He engaged in business as a woolen manufacturer, served several terms in the Rhode Island legislature and

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in 1861 resigned his seat in the state senate, organized a company, of which he was commissioned captain, and went to the front. He was promoted lieutenant-colonel for gallantry at the first battle of Bull Run, fought at Roanoke Island and at New Berne, N. C., and in 1862 was commissioned brigadier-general of volunteers. He commanded a division at Antietam in 1862 and while leading a charge was mortally wounded.

Rodman, Thomas Jefferson, American military officer: b. Salem, Ind., 30 July 1815; d. 7 June 1871. He was graduated from the ordnance department of West Point in 1841, and was appointed to service at various arsenals, where his experiments in the manufacture of guns soon brought him into prominence. His method of casting guns on a hollow core, the metal being cooled by a stream of water running through the inside, was adopted in 1847. This method he later applied to shells and cannon. In 1860 he completed his experiments upon a 15-inch gun for the uses of mammoth powder, the cannon which bears his name. The Rodman gun and mammoth powder were adopted by the United States government in the following year, and soon after by Russia, England and Prussia. In 1865 he was brevetted brigadier-general, and four years before his death promoted to the rank of lieutenant-colonel.

Rodman Gun. See **ORDNANCE**.

Rodney, rôd'nî, Cæsar, American patriot: b. Dover, Del., 7 Oct. 1728; d. there 29 June 1784. He was the grandson of William Rodney, a large landholder under the Duke of York, in the grant to William Penn, and member of Penn's council. As high sheriff of Kent County and judge of all the lower courts of the Province of Delaware, Cæsar Rodney came into prominence as a statesman. He was a delegate to the Stamp Act Congress held in New York in 1765, and as speaker of that body was largely instrumental in bringing about the first Continental Congress, of which he was also a member. In this capacity he was one of the signers of the Declaration of Independence. In 1775, after the second session of the Congress at Philadelphia, he journeyed through his native province sowing the seed of independence, and was appointed brigadier-general in the army under Washington at the beginning of the Revolution. As commander of the Delaware militia he rendered valuable service, for which he was made a major-general in 1777. In this year also he was made president of the State of Delaware, from which office he retired in 1782.

Rodney, Cæsar Augustus, American statesman, son of Cæsar Rodney (q.v.): b. Dover, Del., 4 Jan. 1772; d. Buenos Ayres, Argentina, 10 June 1824. He was graduated from the University of Pennsylvania in 1789, and after his admission to the bar in 1793 practised law in Wilmington, Del. On account of his election to Congress as an anti-Federalist in 1805 he has been called the first Democrat in that body. In 1807 he was appointed attorney-general of the United States by President Jefferson, but resigned this office in 1811, and in the War of 1812 took active part on the Canadian frontier as captain of artillery. In 1821 he again represented Delaware in Congress, and in the following year took his seat in the United States Senate. In 1823 he was appointed minister plenipotentiary to the Argentine provinces.

Rodney, George Brydges, 1ST BARON RODNEY, English naval commander: b. Walton-upon-Thames, and baptized 13 Feb. 1718; d. London 23 May 1792. He became a lieutenant in 1739, first obtained a ship in 1742 and in 1748 went to Newfoundland as governor. On his return in 1751 he was elected member of Parliament. In 1759 he was promoted rear-admiral, and in 1761 sailed to the West Indies, reduced Martinique and took possession of St. Lucia, Grenada and St. Vincent. In 1762 he became vice-admiral and in 1764 was made a baronet. The next year he became governor of Greenwich Hospital. In 1779, having already been promoted to the rank of admiral, he was put in command of a fleet bound for the West Indies with instructions to relieve Gibraltar on his way. This latter was accomplished on 16 Jan. 1780 by capturing or destroying seven ships of the fleet of the Spanish admiral, Don Juan de Langara. Continuing on to the West Indies he encountered the French fleet under Guichen, near Martinique, with indecisive results, though with considerable loss on both sides. In April 1782, he again met a French fleet in the West Indies, this time commanded by Count de Grasse; and after a three days' fight overcame the French, captured de Grasse and his flagship, the *Ville de Paris*, but forewent the larger part of his spoil by not giving chase. Before the news of the victory reached England, Admiral Hugh Pigot had been sent to supersede Rodney, and though he retired from active service, he was rewarded with a pension and a barony. Consult: Mundy, 'Life and Correspondence of Lord Rodney' (1830); Hamay, 'Rodney' ('English Men of Action').

Rodriguez, rôd-rê-gès, a volcanic island in the Indian Ocean; about 375 miles east by north of Mauritius (q.v.), of which it is a dependency. It is 18 miles long by 7 miles wide, and the altitude is about 1,750 feet. It is surrounded by a coral reef. Its isolation has prevented change in its flora and fauna, and for this reason the island has been of interest to the botanist and the zoologist. Until near the end of the 17th century the solitarie, now an extinct bird, was found on this island. The island was discovered by the Portuguese in 1645, and since 1814 it has been a British colony.

Roe, Charles Francis, American soldier: b. New York 1 May 1848. He was graduated at West Point in 1868 and entered the 1st cavalry, being assigned to frontier duty. In 1870 he was transferred to the 2d cavalry; became 2d lieutenant in 1871 and 1st lieutenant in 1880. In his early days in the West he rode 22½ hours from Camp Harney, Ore., to Fort Bidwell, Cal., to carry orders to prevent an Indian outbreak. In 1888 he resigned from the army and engaged in real estate business in New York. He became major of Troop A, New York Volunteer Cavalry, in 1895, and later was appointed major-general. President McKinley appointed him brigadier-general of United States volunteers in June 1898, but he resigned in the following September.

Roe, Edward Payson, American Presbyterian clergyman and novelist: b. Moodna, New Windsor, Orange County, N. Y., 7 March 1838; d. Cornwall, N. Y., 19 July 1888. He studied at Williams College, and at Auburn and Union theological seminaries; was ordained to the Presbyterian ministry; in 1862-5 was a chaplain

in the volunteer service; and from 1865 until his resignation in 1874 held a Presbyterian pastorate at Highland Falls, N. Y. There his addresses on topics of the Civil War gained for him some notice as a speaker. In 1874 he removed to Cornwall-on-Hudson, N. Y., where he cultivated small fruits and turned out a series of novels which sold largely (759,000 copies, it was estimated, at his death) and met with widespread interest, but quite lacked distinction or literary quality. Among the titles are: 'Barriers Burned Away' (1872); 'Opening a Chestnut Burr' (1874); 'A Knight of the 19th Century' (1877); 'A Face Illumined' (1878); 'Driven Back to Eden' (1885); and 'The Earth Trembled' (1887). He published also three books on horticulture. Consult 'E. P. Roe: Reminiscences of his Life,' by his sister, May Roe (1899).

Roe, Francis Asbury, American naval officer: b. Elmira, N. Y., 4 Oct. 1823; d. Washington, D. C., 28 Dec. 1901. He entered the naval service in 1841 as acting midshipman on the John Adams, and received his later training at the Naval Academy at Annapolis, and in service in various parts of the world. He was executive officer of the flagship Vincennes during the Arctic exploring expedition of 1855, and was made a lieutenant in that year. At the outbreak of the Civil War he was appointed executive officer of the Pensacola, which was in the van of Farragut's fleet, and was especially commended for bravery during the famous passage of Fort Jackson and Fort St. Philip. In 1862 he was ordered to the gunboat Katahdin and upon the first day of his command fought the battle of Baton Rouge. For this service he was promoted to the rank of lieutenant-commander. On 5 May 1864, in command of the Sassacus, he defeated the Confederate ram Albemarle and the gunboat Bombshell near Plymouth, N. C. As commander of the Gulf Division of Rear-Admiral Palmer's squadron at Vera Cruz he rendered noteworthy service as negotiator between the forces of Gen. Juarez and the governor of Vera Cruz, and received the surrender of that city in 1867. From 1869 to 1871 he was with the Asiatic fleet and was commissioned captain in 1872. In 1884 he was promoted rear-admiral and was retired the following year.

Roe, Richard. See DOE, JOHN.

Roe-deer, a small European deer (*Capreolus caprea*), the adult measuring about two feet at the shoulders and about 2½ feet at the hind quarters. The buck's antlers are small, and provided with three short branches only. The general body-color is a brown. The tail has a white patch at its root and the chin, belly and inner aspects of the limbs are grayish-white. These animals inhabit mountainous districts, and are monogamous, each male remaining faithful throughout life to one female. The habits of the roe are somewhat like those of the goat, or even of the chamois. It keeps its footing on rocks with great security, bounds very actively, and takes great leaps. Its usual pace, when not very hard pressed, is, however, a kind of canter. It is not gregarious, not more than a buck and doe with one or two fawns being usually seen together. The voice of the

roe-deer, resembling that of a sheep, but shorter and more barking, is often heard through the night. The roe browses on the tender shoots of trees and bushes as well as on herbage, and is thus very injurious to young woods. It is never very thoroughly tamed, and when kept in parks is apt to become mischievous, and the male dangerous. The venison is superior to that of the stag, but not equal to that of the fallow deer. The horns are used for handles of carving knives and similar articles.

Roebing, réb'ling, John Augustus, American civil engineer: b. Mühlhausen, Prussia, 12 June 1806; d. Brooklyn 22 July 1869. He was graduated at the Royal Polytechnic School in Berlin in 1826, his thesis being on suspension bridges. He came to America in 1831 and settled in Pittsburg, Pa. Later he was engaged in surveying the lines of the Pennsylvania railroad across the Allegheny Mountains from Harrisburg to Pittsburg. Having spent some years thereafter in the manufacture of iron and steel wire he utilized his new product in 1844-5 in building an aqueduct across the Allegheny River at Pittsburg, consisting of a wooden trunk supported by wire cables. The bridge comprised seven spans each 162 feet long. In 1846 he built a suspension bridge over the Monongahela River at Pittsburg, and after building several other bridges removed his business to Trenton, N. J., and in 1851 began the construction of the suspension bridge across Niagara River, connecting the New York Central and the Canadian Railway systems. He next built the bridge over the Allegheny River at Pittsburg and during 1856-67 the bridge connecting Cincinnati and Covington. In 1868 he was chosen chief engineer for the construction of the Brooklyn Bridge; but he died the following year from the effects of an injury to one of his feet. The completion of the structure was carried out by his son. He was the author of 'Long and Short Span Railway Bridges' (1869).

Roebing, Washington Augustus, American civil engineer: b. Saxonburg, Pa., 26 May 1837. He was graduated at the Rensselaer Polytechnic Institute, Troy, N. Y., in 1857, and joined his father, John A. Roebing (q.v.), in the construction of the suspension bridge across the Allegheny River at Pittsburg. He served in the Union army, 1861-5; was brevetted lieutenant-colonel in December 1864 for gallant service before Richmond and colonel of volunteers in March 1865 for meritorious service during the war. He joined his father in building the Cincinnati-Covington suspension bridge and became assistant engineer in constructing the Brooklyn bridge. After his father's death in 1869 the entire direction of the work was left in his hands and the bridge was completed in 1883. Since that date he has been engaged as vice-president of the iron and steel wire and wire rope manufacturing concern of John A. Roebing & Sons Co. of Trenton, N. J.

Roebingite, a white, massive mineral, recently found at Franklin Furnace, N. J., having the remarkable composition, $H_{12}Ca_7Pb_2Si_2O_{28}$, which is interpreted by Penfield as being a combination of five molecules of the silicate H_2CaSiO_4 with two molecules of the basic sulphite, $CaPbSO_4$. This is the only known occur-

rence of a sulphite in nature. Named after W. A. Roebbling.

Roebuck, rō'būk, John Arthur, English politician: b. Madras, India, 29 Dec. 1802; d. London, England, 30 Nov. 1879. He was called to the bar in 1831. In 1832-7 and in 1841-7 sat in Parliament for Bath, and for Sheffield in 1849-68 and again from 1874 until his death. He defended the Crimean war, favored the Confederacy in the United States, and supported Beaconsfield in his Eastern policy in 1877-8. In 1879 he became a member of the privy council. He wrote: 'Colonies of England' (1849); 'History of the Whig Ministry of 1830' (1852); etc.

Röediger, rē'dīg-ēr, Emil, German Orientalist: b. Sangerhausen, Thuringia, 13 Oct. 1801; d. Berlin 15 June 1874. He studied at Halle, where in 1830 he became extraordinary and in 1835 ordinary professor of Oriental languages. He removed to a similar post in Berlin in 1860 and remained there until his death. He continued the work of Gesenius' 'Novus Thesaurus Philologicus Criticus Linguae Hebraeae et Chaldaee Veteris Testamenti, Editio ii.' with indexes, additions, and corrections (1858). He edited Gesenius' 'Hebrew Grammar,' and wrote 'De Origine et Indole Arabicæ Librorum V. T. Historicorum Interpretationis Libri Duo' (1829).

Roelofs, rē'lōfs, Willem, Dutch painter and naturalist: b. Amsterdam 10 March 1822. He early made his home in Utrecht, where he learned to appreciate the beauty of the Netherlands landscape. In 1845 he began his art career in The Hague and three years later went to Brussels, thus completing his studies of the Dutch masters. From Belgium he passed to France and received the great artistic impulse of his life from the French landscape painters who represent the aspects of nature as interpretative of spiritual moods. Thus he learnt to depict what we may style the transitions of color and light in scenery with a certain dramatic intensity, and preferred the portrayal of dazzling light effects, and violent contrasts in color; as when the sunlight pours like a torrent through gaps of leafage into the dark forest depths. He has traveled through the whole of Holland and gathered subjects and *motifs* for his pictures from many obscure and unfamiliar spots, painting with equal facility in oil and water color. He is also a skilful etcher. As a naturalist he is well known among students of entomology.

Roentgen, rēnt'gēn, Wilhelm Konrad, German physicist: b. Lennep, Prussia, 27 March 1845. He was educated at Zürich; became Kundt's assistant at Würzburg in 1870, and at Strasburg in 1872; was made lecturer at the latter in 1874; and professor extraordinary in 1876. In 1879 he was appointed professor ordinary at Giessen, in 1888 at Würzburg, in 1899 at Munich. He published in the 'Annalen der Physik und Chemie' the results of numerous experimental labors; but he is best known for his discovery in 1896 of the Roentgen rays (see X-RAYS) which proved capable of such wide application in surgery and other fields, and for which he received in 1901 the Nobel prize for physics.

Rogation Days, the Monday, Tuesday and Wednesday next before Ascension Day: so called because they are observed as days of solemn supplication, with processions and chanting of the Litanies (Greek, *litaneia*, supplication; equivalent to Latin *rogatio*). The custom of processions on these days had its rise in the city of Vienne in Gaul about the middle of the 5th century, when, the city having been visited with earthquakes, fires, and other grave calamities, the bishop, Saint Mamertus, ordered a solemn fast and public supplication of three days to appease the divine indignation: and thereafter the three days' supplication was practised annually, the custom spreading throughout Gaul and beyond the Alps. Everywhere these processions were suppressed in England after the triumph of the Reformation, yet in some localities the perambulation of the boundaries of parishes on the "gang-days" is said still to be kept up. See also LITANY.

Roger I., count of Sicily: b. Normandy about 1031; d. Mileto, Calabria, 1101. Roger's brothers, Drago, Humphrey, William, and Robert Guiscard, had acquired fame in Italy, and obtained possession of the county of Aversa, when he was summoned thither by his brother, Robert, and landed in Apulia in 1057. The two brothers, Robert, the eldest, and Roger, the youngest, founded the kingdom of the Two Sicilies. Roger in 1063 defeated the Saracens at Ceramium, and was thereupon confirmed by the pope in all his conquests in Sicily. He took the title of Count of Sicily, and in spite of certain disputes between the brothers, the complete subjugation of Sicily was the result of their joint efforts. After the death of Robert Guiscard in 1085 the Norman power in Italy came into Roger's hands. The general support given to him by the pope freed him from many dangers. In 1098 he gave him a free brief (the genuineness of which has, however, been questioned), that he would send no legate to Sicily without Roger's consent, and left it to him to decide what bishops should attend the general assemblies of the Church and whom he should detain for the service of the kingdom. With this extension of his spiritual rights Roger introduced many important improvements. Consult Schack, 'Geschichte der Normanen in Sicilien' (1889).

Roger II., king of Sicily: b. about 1095; d. February 1154, second son of Roger I. His elder brother, Simon, died in 1102, and during his minority the government was administered first by his mother, Adelheid, a daughter of the Margrave Boniface of Montserrat, and then by Prince Robert of Burgundy. The free barons of the land, however, leagued with Pope Honorius II. to break the Norman ascendancy. They had no success, and the pope voluntarily confirmed Roger in the possession of Apulia and Calabria. Pope Anacletus extended the confirmation to Capua and Naples; and in 1130 Roger received the title of king. He now pressed so hard upon the barons that Rainulf of Avellino, Robert of Capua, Servius of Naples, and others revolted, receiving support from the German and Greek emperors, Lothar and Emmanuel, and the influence of the anti-pope, Innocent II., who excommunicated the Sicilian monarch. Roger in 1132 was defeated by them in

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an engagement; but having promptly assembled a new army suddenly recovered all he had lost, and although the revolt lasted till 1136 it terminated to Roger's advantage. He took Malta and the adjacent islands, and afterward made himself master of Tripoli. With a second fleet he sailed to Madia, and took it in 1148. At the same time he led an expedition against the kingdom of Greece, in which he took Corfu and Thebes, and plundered Corinth, Athens, Cephalonia, and Negropont. In 1152 he extended his dominion from Tripoli to Tunis, and from the desert of Mohrab to Kairwan. The peace which followed he turned to good account, reforming the law, introducing order into the administration, and patronizing science. Consult Schack, 'Geschichte der Normanen in Sicilien' (1889).

Roger de Hoveden, English historian: lived in the last half of the 12th century; d. Hoveden, now Howden, East Riding of Yorkshire. He was a lawyer, in holy orders, and lived at the court of Henry II., whom he served in many diplomatic and professional capacities. His latter days were spent as a prebend of the collegiate church at Howden, to which he had retired on the death of his royal master. The history or chronicle which he wrote during his half monastic retirement was based upon 'Historia Saxonum vel Anglorum post Obitum Bedæ' (1101). The main additions made by Roger de Hoveden to this work include: the miracles of Edward the Confessor; an abstract of the charter by which Hominburgh and Brackenholm were ceded by William the Conqueror to Durham; a list of French knights at the siege of Nice. Naturally the most valuable part of the Chronicle is that which relates to the time in which Roger lived (1169-92). Edward I. in 1291 caused diligent efforts to be made to secure a copy of it, that he might collect therefrom evidence bearing on the vexed question as to the homage due the king of England from the Scottish Crown. The Chronicle was first printed in 1696. Consult Morley, 'English Writers' (Vol. III.).

Roger of Wendover, English chronicler: d. 1237. He was a monk in Saint Alban's Abbey, and lived to be prior of Belvoir. His chronicle extends from 1189 to 1235, and bears the title 'Flores Historiarum' in the 'Historia Major.' His collaborator was John de Cellis, and the work was continued by Matthew of Paris. Consult Morley, 'English Writers.'

Roger Williams University, an institution for the education of the colored race at Nashville, Tenn. It was established in 1863 by the Baptist Home Mission Society. Its work is in three grades, elementary, secondary, and collegiate; a classical, a scientific, an English, and a normal course are offered; there is also provision for professional instruction and for industrial training in printing, sewing, etc. The institution is supported by the Baptist Home Mission Society and by tuition fees; there is no endowment; the income in 1903 amounted to \$9,400; the grounds and buildings were valued at \$150,000; and the library contained 6,000 volumes. The students number about 250, and the professors and instructors 14.

Rogerenes, rōj'ér-ēnz, **The**, the name given a former evangelical sect at New London,

Conn. They were of non-resistant principles, and were resolutely opposed to any dictation regarding religious observances, aside from the teachings of the New Testament.

Rogers, rōj'érz, **Fairman**, American civil engineer: b. Philadelphia 15 Nov. 1833; d. Vienna, Austria, 23 Aug. 1900. He was graduated from the University of Pennsylvania in 1853, was lecturer on mechanics at Franklin Institute, Philadelphia, in 1853-65, and professor of civil engineering at the University of Pennsylvania 1855-70. He was a volunteer in the Union army in 1861 and completed the survey of the Potomac River northward from Blakiston Island in 1862. He was a trustee of the University of Pennsylvania in 1871-86, presented to the university a valuable library of works on engineering in 1878, and finally resigned his trusteeship because of continued residence abroad. Besides various valuable scientific papers he wrote: 'Terrestrial Magnetism and the Magnetism of Iron Ships' (1883); and 'Manual of Coaching' (1900).

Rogers, Henry, English Congregational clergyman and essayist: b. St. Albans 18 Oct. 1806; d. Pennal Tower, Machynlleth, Wales, 20 Aug. 1877. He studied at Highbury College and became a Congregationalist minister at Poole, Dorsetshire, in 1829. Three years later he was appointed lecturer on rhetoric and logic in Highbury College, and in 1836 became professor of English language and literature in University College, London. He was made professor of English language and literature and mental philosophy in Spring Hill College, Birmingham, in 1839, and held that post till 1858 when appointed principal and professor of theology in the Lancashire Independent College. From 1839 he contributed regularly to the 'Edinburgh Review,' some of his contributions to that periodical being collected in 'Essays Critical and Biographical' (1874), and 'Essays on Some Theological Controversies' (1874). His chief work, 'The Eclipse of Faith,' a piece of skilful dialectics, was published anonymously in 1852, being followed by a 'Defence of the Eclipse of Faith' (1854), in which he replied to F. W. Newman's reply to his earlier work.

Rogers, Henry Darwin, American geologist: b. Philadelphia 1 Aug. 1808; d. near Glasgow, Scotland, 29 May 1866. He was appointed professor of physical sciences at Dickinson College, Carlisle, Pa., in 1830, studied in London in 1831, was lecturer on geology at Franklin Institute in 1833-4, and in 1835-46 was professor of geology and mineralogy at the University of Pennsylvania. In 1835 he made a geological survey of the State of New Jersey, and was appointed geologist in charge of the survey of Pennsylvania in 1836. The survey was interrupted in 1841-51 by lack of appropriations, and Rogers was engaged as an expert for various coal companies, until he resumed the survey which was then concluded in 1854. The final report of the survey was entrusted to him, and he completed the work in Edinburgh. From 1857 until his death he was professor of geology and natural history at the University of Glasgow. He published: 'Description of the Geology of the State of New Jersey' (1840); 'The Geology of Pennsylvania, a Government

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Survey' (1858); numerous geological reports.

Rogers, Henry H., American capitalist: b. Fairhaven, Mass.; d. 19 May 1909. He was educated in the schools of his native town, and afterward became connected with the Standard Oil Company, of which he was a large stockholder and a vice-president. Of the great wealth acquired through his business enterprises he devoted large sums to public and benevolent uses, especially for the benefit of Fairhaven. Among his gifts to the town are two schools, a town hall, the Millicent Library (a memorial to his deceased daughter), a Masonic building, and memorial church buildings, comprising a group said to be excellent examples of Tudor architecture, the church itself being perhaps the finest of its size ever built in America. These buildings were erected in memory of the giver's mother. He also built at Fairhaven, and presented to the Millicent Library, a system of waterworks from which it derives an income; and as superintendent of streets he made, presumably in great part at his own expense, vast improvements in the public highways.

Rogers, Henry J., American inventor: b. Baltimore, Md., 1811; d. there 20 Aug. 1879. He is known as the inventor of a code of flag signals, adopted by the United States in 1846, and was also the originator of a code of signals in which colored lights are used. As an associate of Samuel F. B. Morse (q.v.) he was instrumental in constructing the first telegraph line, and was the inventor of several important telegraphic instruments, and was one of the organizers of the first telegraph companies in the United States, the Magnetic Telegraph Company, established in 1845. He served in the Civil War as acting master of the volunteer navy. Subsequently he was prominently identified with the American, the Bankers' and Brokers', the Southern and Atlantic, and the Western Union Telegraph companies. His writings include: 'The Telegraphic Dictionary and Seaman's Signal Book' (1845); 'The American Code of Marine Signals' (1854); and, in collaboration with W. F. Larkins, 'Rogers' Commercial Code of Signals for All Nations' (1859).

Rogers, Henry Wade, American lawyer: b. Holland Patent, N. Y., 10 Oct. 1853. He was graduated at the University of Michigan in 1874 and was admitted to the bar in 1877. In 1883 he became professor in the law school of the University of Michigan and was its dean from 1885 to 1890. From 1890 to 1901 he was president of Northwestern University, and in the latter year became connected with the Yale Law School, where he is at present dean. He has written: 'Illinois Citations' (1881), and 'Expert Testimony' (1883).

Rogers, Howard J., American educator: b. Stephentown, N. Y., 16 Nov. 1861. His early education was obtained in public schools and at the Pittsfield, Mass., High School; after graduating in 1880 he entered Williams College, from which he was graduated A.B. in 1884. He was admitted to the New York State Bar in 1887. From 1884-92 he was teacher of history and literature in the Albany Boys' Academy; superintendent of the New York State Educational Exhibit at the World's Columbian Exposition, Chicago, 1892-4; acting-secretary of the

New York Commission there, and editor of the official report of the commission, 1894-5; Deputy-Superintendent of Public Instruction, New York State, 1895-1901; Director of Education and Social Economy for the United States Commission at the Paris Exposition of 1900. At the St. Louis Exposition, 1904, he was Chief of the Departments of Education and of Social Economy, and also Director of Congresses and editor of the Proceeding of the International Congress of Arts and Sciences. In April, 1904, he became First Assistant Commissioner of Education of the State of New York, having charge of Higher Education. He was decorated, in 1901, by the French Republic with the Order of the Legion of Honor of France, and promoted to the rank of *officier* in 1904; in 1904, by King Victor Emanuel III. of Italy, with the Order of Chevalier of Saint Maurice and Lazare; by King Oscar II. of Sweden, with the Order of the North Star; and in 1905, by Emperor William II. of Germany, with the Order of the Red Eagle, rank of officer, and by King Leopold II. of Belgium with the Royal Order of Leopold.

Rogers, Jacob S., American manufacturer: b. Paterson, N. J., 1823; d. New York 2 July 1901. In 1856 he became head of the Rogers Locomotive and Machine Works of Paterson. He retired from active business in 1897, and upon the completion of outstanding contracts closed the works 1 Dec. 1900. He bequeathed the bulk of his estate to the Metropolitan Museum of Art, New York. Litigation was begun by other legatees, but a settlement was effected by the payment to these of \$250,000. The residuary estate, about \$5,000,000, went to the museum.

Rogers, James Edwin Thorold, English economist: b. West Meon, Hampshire, 1823; d. Oxford 12 Oct. 1890. He was educated at King's College, London, and at Oxford, took orders in the Established Church, and appointed curate of St. Paul's, Oxford. After 1860 he lost sympathy with the Tractarian movement and in 1870 was the first to take advantage of the new Clerical Disabilities Relief Act to resign his orders. He received the Tooke professorship of statistics and economic science at King's College, London, in 1859. In 1862 he was elected for five years Drummond professor of political economy at Oxford, but failed of reelection at the end of that term on account of his advanced religious views. He was again elected to the chair in 1888, however, after the death of Bonamy Price, who had held the post in the interval. In 1880 he entered Parliament for Southwark and in 1885 was elected for Bermondsey; but his adoption of Gladstone's home rule policy in 1886 lost him his seat in the general election of that year. His great work is his 'History of Agriculture and Prices in England' (1866-93), covering the period from 1259 to 1793. Based upon this was his 'Six Centuries of Work and Wages' (1884).

Rogers, James Guinness, English Congregational clergyman: b. Enniskillen, Ireland, 29 Dec. 1822. He was educated at Trinity College, Dublin, and at Lancashire Independent College. He held his first charge at Newcastle-on-Tyne in 1846-51, was pastor at Ashton-under-Lyne 1851-65, and from the last-named date until 1902 was minister of the Clapham Congregational Church in London. He has published: 'Priests and Sacraments' (1870); 'Present Day Religion and Theology' (1887); 'Christ for the

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World' (1895); **'The Christian Ideal'** (1898); etc.

Rogers, John, English Reformed clergyman, first martyr in the Marian persecution: b. Deritend, Aston parish, near Birmingham, about 1500; d. London 4 Feb. 1555. He obtained his education at Cambridge, in 1532-4 was rector of Trinity the Less, London, and then went to Antwerp as chaplain to the English merchants there. There, it is said, he was led by William Tindal, then busy on the translation of the Old Testament into English, to change his religious views. He then took charge of a Protestant congregation at Wittenberg, and prepared for the press an English rendering of the Bible, including Tindal's New Testament, and Old Testament as far as the end of 2 Chronicles. His part in the translation was slight, but his marginal notes formed the earliest English commentary on the Scriptures. The whole constituted the second complete version in English, Coverdale's having appeared in 1535, while this appeared, with the pseudonym "Thomas Matthew" on the title-page, in 1537. In 1548 Rogers returned to England, in 1550 was simultaneously made rector of St. Margaret Moyses, London, and vicar of St. Sepulchre there. In 1551 he received the prebend of St. Pancras in St. Paul's cathedral. In 1553 he preached twice at Paul's Cross, the second time against Catholicism (6 August), three days after Queen Mary's arrival in London. He was shortly deprived of the emoluments of his benefices, on 27 Jan. 1554 imprisoned at Newgate at the instance of Bonner, new bishop of London, and after two examinations (22, 29 January), was burned at the stake at Smithfield; showing, says Fox, "most constant patience, . . . exhorting the people constantly to remain in that faith and true doctrine which he before had taught." Consult Fox, *'Book of Martyrs'*; and the biography by Chester (1861).

Rogers, John, American sculptor: b. Salem, Mass., 30 Oct. 1829; d. New Canaan, Conn., July 1904. In early life he developed a talent in clay modeling; and in 1858 went to Europe where he studied under the best masters in Paris and Rome. He returned to the United States in 1859, and modeled a large number of statuettes, of which his first group, *'The Checker Players,'* attracted popular attention. Many of these *'Rogers Groups'* pertained to the Civil War and elicited general popular approval rather than the unstinted admiration of the art critic. He also executed the equestrian statue of Gen. Reynolds, now at the city hall in Philadelphia.

Rogers, Randolph, American sculptor: b. Waterloo, N. Y., 6 July 1825; d. 15 Jan. 1892. He studied art in Europe from 1848 to 1850 when he returned to the United States, where he executed a statue of Bulwer's blind heroine *'Nydia'* and a figure of President John Adams. He for five years had a studio in New York, but established himself in Rome in 1855. In 1858 he began the bronze doors for the Capitol at Washington and subsequently executed several portrait statues and memorial monuments in Providence, Richmond, Detroit, and other cities. His colossal figures of Gens. Lewis and Nelson, for the Washington monument, which Crawford had begun to raise near Richmond, are good specimens of his work. Among his other statues

is that of Seward in Madison Square Park, New York. Perhaps one of his best works is the figure of the *'Resurrection Angel'* for the tomb of Col. Colt in Hartford, Conn.

Rogers, Robert, American author and soldier: b. Dunbarton, N. H., 1727; d. England about 1800. He raised a company of soldiers known as *'Rogers' Rangers'* and commanded them efficiently during the French and Indian War of 1755-63. He visited England in 1765 and was appointed governor of Mackinaw, Mich., but while holding this office was charged with designs for delivering his own fort to the French and was sent to Montreal in irons. At the outbreak of the American Revolution he declined a commission in the Colonial army, though professing a sincere interest in the cause of the colonies, and later aroused the suspicions of Washington. He was secured but was released on parole, which he broke, accepted a commission in the British army and organized the *'Queen's Rangers,'* recruits to which he promised their *'proportion of rebel lands.'* Shortly after 1776 he went to England. He was proscribed and banished by the provincial government of New Hampshire in 1778. Further traces of his life are lacking. He wrote: *'A Concise Account of North America'* (1765); *'Ponteach, or the Savages of America,'* a tragedy in verse, now very rare (1766); and *'A Diary of the Siege of Detroit in the War with Pontiac,'* first published in 1860.

Rogers, Robert Cameron, American poet: b. Buffalo, N. Y., 7 Jan. 1862. He was graduated from Yale in 1883, and has since published *'Wind in the Clearing and Other Poems';* *'For the King and Other Poems';* and in prose, *'Will o' the Wisp,'* a sea tale; and *'Old Dorset: Chronicles of a New York Country Side.'*

Rogers, Samuel, English poet: b. Stoke-Newington, London, 30 July 1763; d. London 18 Dec. 1855. After completing his attendance at private school he entered the Rogers banking establishment as a clerk, but his favorite pursuits were poetry and general literature. He went, on one occasion, to pay in person his respects to Dr. Johnson; but hurried away in dread of raising the knocker. In 1786 he printed anonymously *'An Ode to Superstition, with Some Other Poems.'* His *'Pleasures of Memory,'* with which his name is principally identified, appeared in 1792. It is a carefully finished and graceful production, but somewhat deficient in force and vigor, and though every one is familiar with the name, the *'Pleasures of Memory'* is a poem that at the present day is comparatively little read. It was received with unbounded applause, and the reputation of the author was still further confirmed by the publication in 1798 of *'An Epistle to a Friend and Other Poems.'* He now built the celebrated house in St. James' Street, Westminster, which he had in part decorated by Stothard and Flaxman; filled with antiques, books, and art-works, all selected in admirable taste; and long made the centre of intellectual society. It ought also to be recorded that, though possessed of much surface brusqueness, and bitter of tongue, no man was more generous in relieving distress or assisting struggling genius; and Sheridan, Moore, Campbell, and others, were all indebted

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at different times to his generous liberality. He published in 1810 his poem of 'Columbus,' which was severely handled by the 'Quarterly Review,' and met with little success. 'Jacqueline, a Tale,' appeared in 1814, in the same volume with Lord Byron's 'Lara.' The same year he visited Paris, extending his tour to Italy, and remained abroad for several years. On his return in 1819 he published the poem of 'Human Life,' and in 1822 appeared the first part of his 'Italy,' a series of poems descriptive of the scenery and antiquities of that country, and perhaps the finest of all his works. Continuations of it followed at successive periods, and a complete edition in 1830, beautifully illustrated by Prout, Stothard, and Turner, which, with an illustrated edition of his other poems, composes two 8vo volumes, and was issued at a large outlay to the author. It proved, however, a remunerative speculation. In 1850 Rogers was offered the laureateship, vacated by the death of Wordsworth, but declined the appointment, which was bestowed on Tennyson. His unique collection of works of art was disposed of by auction after his death. Rogers' long life saw many literary changes, from the times of Goldsmith and Johnson to those of Thackeray and Dickens. He was a kind of English 'autocrat of the breakfast table'; famous for his anecdotes and bon-mots, and his discussions of politics and art. He was certainly a representative, though among the less prominent, of a brilliant period of English poetry; with him care and taste served for genius. A volume of his 'Table Talk' was published by Alexander Dyce (1860). Consult Clayden, 'Early Life of Samuel Rogers' (1887), and 'Rogers and His Contemporaries' (1889). The correspondence, journals, and memoirs of the earlier 19th century abound in references to him.

Rogers, William Augustus, American astronomer: b. Waterford, Conn., 13 Nov. 1832; d. Waterville, Maine, 1 March 1898. He was graduated from Brown University in 1857, engaged in teaching at Alfred University and in 1858 accepted its chair of mathematics and astronomy. In 1864-5 he served in the United States navy and in 1866-7 studied at Yale, but resumed his duties at Alfred after each interruption, and under his direction the observatory there was built and equipped. He was appointed assistant at the Harvard Observatory in 1870 and became assistant professor of astronomy in 1877. He accepted the chair of astronomy and physics at Colby University in 1886 and remained there until his death. His work at Harvard Observatory consisted of observing and mapping all the stars down to the 9th magnitude, in a narrow belt a trifle north of our zenith, a task which consumed 11 years in observations and 15 years for their reductions. He overcame the difficulty of finding micrometer spiderwebs suitable for his work by etching glass plates with hydrofluoric acid, an expedient which proved so successful that he furnished the government with the plates used by the expedition to observe the transit of Venus. He was an acknowledged authority on micrometrical work and established standards of measurement for practical mechanical work.

He was an active member of various scientific societies and published nearly 70 papers concerning his specialties. He also published, in the 'Annals of Harvard Observatory': 'Observations made with Meridian Circle, 1871-2'; 'Catalogue of 8,627 Stars Between 49° 50' and 50° 10' of North Declination, 1875'; 'Journal of Zone Observations During the Years 1875-1883'; etc.

Rogers, William Barton, American geologist and physicist: b. Philadelphia 7 Dec. 1804; d. Boston 30 May 1882. He was educated at William and Mary College, gave scientific lectures before the Maryland Institute in 1827, and in 1828 became professor of natural philosophy and chemistry in William and Mary College. From 1835 until his resignation in 1853 he was professor of natural philosophy in the University of Virginia. He added to the course mineralogy and geology; and organized and directed the Virginia geological survey until its discontinuance in 1842. During his occupancy of this chair he devoted much of his time to original researches in geology, chemistry, and physics. He was also a leading member of the Association of American Geologists and Naturalists (organized 1840), and to its 'Transactions' contributed important memoirs, including observations on the temperature of coal mines in eastern Virginia. In 1853 he removed to Boston, where he continued his researches and voluminous contributions to scientific journals of the United States and Europe, and in 1862 lectured before the Lowell Institute on "The Application of Science to the Arts." At the request of several citizens of Boston, he drew up in 1859 a scheme entitled "Object and Plan of an Institute of Technology," to include a society of arts, a museum of arts, and a school of industrial science. He then memorialized the State legislature, and at length obtained from the State a charter (1862), and the grant of a tract in the Back Bay district upon which to place the buildings of the institution. Chosen the first president of the Massachusetts Institute of Technology, he was made also professor of physics and geology, and in 1864 visited Europe for the purchase of scientific instruments and appliances. He organized the system of teaching which still in general obtains in the Institute, and whose leading feature was laboratory instruction not only in chemistry, but in physics, mechanics, and mining. He resigned his post as president in 1870, but resumed his duties from 1878 to 1881, when he was succeeded by Francis A. Walker (q.v.). In 1847 he presided at the meeting by which the Association of American Geologists and Naturalists was enlarged into the American Association for the Advancement of Science; was made president of the latter in 1875; was a corporate member of the National Academy of Sciences; became its president in 1878; and was a founder and the first president of the American Social Science Association. He has been characterized as one who had in a high degree "the faculty of presenting the claims of science on popular interest and respect with force and lucidity." His gifts of expression as speaker and writer were excellent. Many of his researches added materially to scientific knowledge. Among his books were

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'The Strength of Materials' (1838); 'The Elements of Mechanical Philosophy' (1852); and 'Papers on the Geology of Virginia' (1884), comprising his yearly reports in 1836-40. Consult the 'Life and Letters,' published in 1897.

Rogersville, rōj'ēr-z-vil, Tenn., village, county-seat of Hawkins County; on the Southern railroad; about 45 miles east-northeast of Knoxville. It is in a fertile valley, bordered by mountainous regions rich in variegated marble, and building stone, and having considerable coal. The chief manufacturing establishments are flour mills, furniture factories, and machine shops. A number of the villagers have employment in the marble quarries. The educational institutions are the McMinn Military Academy, and the Swift Memorial Institute. The latter was founded in 1848 by the Presbyterian Church. There are good public schools and two school libraries. The national bank has a capital of \$75,000. Pop. (1910) 1,582.

Rogersville, Engagements at. On 5 Nov. 1863 Col. Israel Garrard, with the 7th Ohio cavalry, 2d Tennessee mounted infantry, and a battery of four guns, occupied Rogersville, Tenn., camping near the town. During the day Gen. W. E. Jones, with about 2,500 Confederate cavalry, crossed the Holston River near Kingsport, made a night march by roads badly guarded, and at daybreak of the 6th surprised and captured Garrard's outposts, and advanced towards his camp, attacking and routing the 7th Ohio, Garrard and a few of his men escaping to Morristown. Jones then attacked the Tennessee regiment, which made a good resistance, but was soon surrounded and obliged to surrender. The Union loss was about 20 killed and wounded, and 650 men, four guns, two colors, 1,000 horses and mules, and 40 wagons and ambulances captured. The Confederate loss, as reported, was 10 killed and wounded. News of the disaster caused a hasty retreat of the Union forces from Jonesboro and Greeneville to Bull's Gap, where it was learned that Jones had not advanced beyond Rogersville, and the retreat ended. At the same time Jones retreated in an opposite direction to the Virginia line.

On 21 Aug. 1864 Rogersville was held by a small force of Confederate cavalry, under Col. Watkins, which was attacked at daybreak by a detachment of the 13th Tennessee cavalry, under Lieut.-Col. Ingerton. Several Confederates were killed and wounded, and Watkins, with 25 of his men, captured, the remainder escaping to Kingsport. On 8 Oct. 1864 Gen. John C. Vaughn, having driven a Union force from Kingsport, followed it to Rogersville, and attacked with his brigade, killing 10 and wounding several Union troops, and driving the remainder to Bull's Gap. On 10 December Gen. A. C. Gillem, with a Union brigade, marched from Knoxville, on the 12th drove in the pickets of Gen. Duke's brigade, and followed to Big Creek, four miles from Rogersville, where the Confederates had taken a strong position. With a part of his command Gillem made a flank movement, charged with the other part, and drove the Confederates from position and through Rogersville, in the direction of Kingsport, where they were overtaken next day and

routed, with some loss. Consult: 'Official Records' Vols. XXXI, XXXIX, and XLV.

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Roget, rō-zhā', Peter Mark, English physician: b. London 18 Jan. 1779; d. Malvern, Worcestershire, 12 Sept. 1869. He was educated at the University of Edinburgh and was appointed physician to the Manchester Infirmary in 1804. In 1808 he removed to London, where he became physician to the Northern Dispensary. He was elected a fellow of the Royal Society in 1815 and for 20 years served as its secretary. He was professor of physiology at the Royal Institute in 1833-6, and in 1837 was active in the establishment of the University of London, in the senate of which he continued a member until his death. He retired from practice in 1840 and devoted himself to literature and to mechanics, for which he had decided talent. He wrote: 'Animal and Vegetable Physiology Considered with Reference to Natural Theology' (1834); 'Physiology and Phrenology' (1838); and the famous 'Thesaurus of English Words and Phrases' (1852).

Roggeveld (rōg'gē-vēld) Mountains, in Africa, in the southwestern division of Cape Colony, running northwest to southeast with an average height of 5,000 feet. They form a western continuation of the Nieuwveld Mountains.

Rogier, rō-zhē-ā, Charles Latour, Belgian statesman: b. St. Quentin 17 Aug. 1800; d. Brussels 27 May 1885. He was educated at the University of Liège and at the outbreak of the Belgian revolution in September 1830 became a revolutionary leader in Brussels. On 24 September he was made president of the administrative commission and later went as a delegate of the provisional government to Antwerp. After an armistice had been arranged with Holland, he exercised absolute power in the reorganization of the administration of the city. He represented Liège in the National Congress, voted to establish a hereditary monarchy, and proposed the adoption of the elective second chamber. He became governor of the province of Antwerp in 1831 and the next year minister of the interior. He retired in 1834 after having carried a law providing for the establishment in Belgium of the first railway in Europe. From 1834 to 1840 he was again governor of Antwerp; and leader of the Liberal party in opposition 1841-7. He became prime minister and minister of the interior in 1847 and by his energy and foresight Belgium escaped the revolutionary crisis that involved Europe in 1848. In 1850 he organized secondary education under control of the state; but retired from office in 1852. Again becoming prime minister in 1857 one of the first acts of his ministry was the fortification of Antwerp. In 1861 he became minister of foreign affairs and succeeded in freeing the navigation of the Scheldt, which fact contributed to make Antwerp one of the important ports of Europe. He retired from ministerial office in 1868, though he sat for Tournai until his death.

Rogue Money, the popular name for an assessment formerly levied on every county in Scotland "for defraying the charges of apprehending criminals, or subsisting them when apprehended, and of carrying on prosecutions against them." This tax was first imposed by

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a statute of George I., on the assertion that criminals were in the habit of escaping punishment for lack of the funds necessary to bring them to justice. The freeholders in each shire were directed to fix the assessment at any of the head courts yearly, and to appoint collectors. By an act of Victoria rogue money in the shires was abolished, and in lieu thereof power was conferred on the Commissioners of Supply to levy by rate a "County General Assessment."

Rogue (rōg) River Indians, the name applied to a number of Indian tribes on Rogue River, southwestern Oregon, most of which belonged to the Athapaskan stock, but the members of the Takilman stock were also included. They were not friendly to the early settlers, and in 1853, with neighboring tribes, finally resented the continued encroachments on their lands by conducting a succession of massacres and outrages which continued until 1856, when they were compelled to submit to American troops and sent to Grande Ronde Reservation, where they remained until the spring of 1857 when they were finally established on Siletz Reservation. Here, with five other tribes, they now number 453.

Rohan, Henri de, ön-rē dē rō-än, DUKE OF, French general: b. Castle of Blain, Brittany, 21 Aug. 1579; d. Königsfeld 13 April 1638. In his 16th year he joined the court of Henry IV., whose childless marriage led him to entertain the hope that, as a very near relative, he might one day succeed him in Navarre, but in 1610 the assassination of the king dashed all his hopes. The opposing parties again flew to arms and Rohan placed himself at the head of the Calvinists. But Louis XIII. and Richelieu, the all-powerful minister, annihilated the political existence of the Huguenots. Rohan then withdrew from his native land, and in exile wrote 'Mémoires sur les Choses advenues en France depuis la Mort de Henri IV.' (1630). In the wars of Venice against Austria he commanded the troops of the republic till the Peace of Cherasco in 1631. Later he went to Geneva, where he composed his 'Mémoires et Lettres sur la Guerre de la Valteline' (1638). In Germany the Roman Catholic league had made war against the Protestants, and Rohan in 1638 joined Bernard of Weimar, then commanding the Protestant army on the Rhine. He was wounded at the battle of Rheinfelden, 28 Feb. 1638, and his death followed shortly afterward. Besides the works mentioned above he wrote 'De l'Intérêt des Princes et Etats de la Chréienté' (1638).

Rohan, Louis René Edouard, PRINCE DE. See DIAMOND NECKLACE.

Rohilkhand, rō-hīl-kūnd' or -känd', or **Rohilcund**, India, a division of the United Provinces of Agra and Oudh, bounded north by the Himalayas, separating it from Kumaon, west and southwest by the Ganges, and east and south-east by Oudh; area, 10,885 square miles. The surface is a plain, with a gradual slope south, in which direction its principal streams, Ramganga, Deoha, and others, flow. Its north frontier is occupied by an extensive forest; elsewhere palms, the sugarcane, cotton, and the finer fruits of the temperate zone flourish. It

takes its name from the Rohillas, an Afghan tribe, who gained possession early in the 18th century. The division is subdivided into the districts Bijnur, Muradabad, Budaon, Bareilly, Terai, and Shahjahanpur. It encloses the native principality of Rampur. Pop. of division, 5,343,674.

Rohlfs, rōlfs, Anna Katharine Green, American novelist: b. Brooklyn, N. Y., 11 Nov. 1846. She was graduated from Ripley College (Poultney, Vt.), in 1867, and in 1884 was married to Charles Rohlfs. In 1878 she won a great success with 'The Leavenworth Case,' a detective story with an ingenious and well-elaborated plot. With the exception of a dramatic poem, 'The Defence of the Bride' (1882), and a drama, 'Rifisi's Daughter' (1887), her other works follow similar lines. Among the titles are: 'A Strange Disappearance' (1879); 'The Mill Mystery' (1886); '7 to 12' (1887); 'A Matter of Millions' (1890); 'The Woman in the Alcove' (1906); 'That Affair Next Door' (1897); 'The Circular Study'; 'The Filigree Ball' (1903); 'The Millionaire Baby,' 'The House in the Mist' (1904).

Rohlfs, Friedrich Gerhard, German African traveler: b. Vegesack, Germany, 14 April 1831; d. Godesburg, Prussia, 3 June 1896. He was educated at Heidelberg and Göttingen and in 1855-60 served as a surgeon in the French army at Algiers. He traveled through Morocco in 1860 and in 1862 explored the Taflet Oasis. He traveled in North Africa in 1863 and in 1865, joined the English expedition to Abyssinia in 1867, and in 1868 traveled in Cyrenaica. He conducted an expedition through the Libyan Desert in 1873-4, traveled in North America in 1875-6, and in 1878 again visited Africa, penetrating to the Kufra Oasis. He traveled in Abyssinia in 1880 and in 1884-5 acted as German consul at Zanzibar. He wrote: 'Journey through Morocco' (1869); 'Across Africa' (1874-5); 'My Mission to Abyssinia' (1883); 'What News from Africa' (1887); etc.

Rojas y Zorrilla, rō'hās ē thōr-rēl'yā, Francisco de, Spanish dramatist: b. Toledo, Spain, 4 Oct. 1607; d. about 1680. Information concerning his life is of a fragmentary character and he is frequently confused with several other persons of the same name. He seems to have studied at the universities of Toledo and Salamanca and his work had become famous by 1632, as Montalván mentions him in high terms in his 'Para Todos' of that year. There was a rumor that he had been assassinated in 1638 but it was clearly unfounded, as in 1644 he was honored with the mantle of the Order of Santiago, an evidence of favor at court. He was author of numerous plays and sacred pieces, but took no pains to preserve his works and many of them have been lost, though he did publish two 'Parts' of his dramas (1640-5) and announced a third which never appeared. Among the best of his remaining works are: 'Del Reyabajo ninguno'; 'Entre bobos anda el juego'; 'Lo que son mujeres'; 'Casarse por vengarse.' No complete edition of his remaining works has been published, but an excellent selection is given in Rivadeneira's 'Biblioteca de Autores Españoles' (Vol. LIV., 1866).

Rokitansky, rō-kē-tān'skē, Karl, BARON von, Bohemian anatomist: b. Königgrätz 19 Feb. 1804; d. Vienna 23 July 1878. He studied at Prague and Vienna; became professor of pathological anatomy at the University of Vienna in 1834, and continued there until 1875. His great work, 'Handbuch der pathologischen Anatomie' (1842-6), stands as the foundation of the science of pathological anatomy. It was translated by order of the Sydenham Society in 1849-52. In 1869 Rokitansky became president of the Austrian Academy of Sciences.

Roland, Jean Marie de la Platière, zhôn mā-rē dē lā plā-tē-ār rō-lān, French patriot: b. Thizy (Beaujolais) 18 Feb. 1734; d. Rouen 15 Nov. 1793. From a humble position in the mercantile world, he rose to eminence in the city of Amiens, in which he held the office of inspector of manufactures. His interests, however, were not in trade, and his views upon political economy and the great problems of government brought him into the ranks of the philosophers of his day. In 1780 he married Manon Jeanne Philpon, whose share in the Revolution was even greater than his own. At the outbreak of the Revolution he joined the Moderate Republican party, during whose brief rule he was made minister of the interior. This position he held from March until June 1792, when the Girondists were forced to retire. After the conflict in Paris 10 August, Roland was recalled, but the Jacobin spirit was too strong, and he was forced to flee. Upon hearing of the death of his wife he took his own life. Consult Lamartine, 'Histoire des Girondins' (1847: English translation by Ryde).

Roland, Manon Jeanne Philpon, wife of Jean Marie Roland (q.v.): b. Paris 17 March 1754; d. there 9 Nov. 1793. With a mind bent upon interests far beyond her years from earliest childhood. Mademoiselle Philpon, the daughter of a Paris engraver, developed at 19 remarkable talents, and at 24 into a woman of great brilliancy of intellect, a disciple of Rousseau, the emancipation of the common people her creed, and their deliverers, the philosophers and patriots of France, her friends and counsellors. In 1779 she was married to M. Roland, with whose political fortunes her life was thenceforth bound. Her faith in the outcome of the Revolution was that of a devotee, her enthusiasm the inspiration of a great party. At first the friends and confidants of Robespierre and those who were afterward leaders of the Jacobin element, the Rolands became the defenders of the more moderate republican idea, and were among the greatest martyrs to this cause. On the fall of the Girondists in the summer of 1793, Madame Roland was arrested, and on the 9th of November was guillotined. During her imprisonment she wrote her famous 'Mémoires,' which were afterward published, together with her correspondence with the other leaders of the French Revolution. Consult: Lamartine, 'Histoire des Girondins,' English translation by Ryde (1849); 'Correspondence de Madame Roland,' edited by C. Perroud (1901); Tarbell, 'Life of Madame Roland' (1896).

Roland, rō'lānd (Italian, ORLANDO), hero of romance and one of the paladins of Charle-

magne, of whom he is represented as the nephew. His character is that of a brave, unsuspicious, and loyal warrior, but somewhat simple in his disposition. According to the 'Song of Roland' (11th century) which forms part of the 'Chansons de Geste,' Charlemagne, after a six years' stay in Spain, resolved to return home. By the advice of Roland the emperor sent Ganelon to Saragossa to receive the homage of the Saracen king Marsilius. This mission had been fatal to all who had been formerly sent on it, and Ganelon, to revenge himself on Roland, betrayed to Marsilius the line of march of the Christian army. Marsilius collects an immense host, allows Charlemagne to cross the Pyrenees with the main body of his force, and falls upon the rear-guard commanded by Roland (778). A desperate struggle ensued; 100,000 infidels fell, and Roland had only 50 remaining of the 20,000 warriors whom he had led into the narrow pass of Roncesvalles (Roncevaux). Another pagan army hastens up. Seeing himself now fairly overpowered Roland at last sounds his enchanted horn, which is heard beyond the mountains by the emperor. The traitor Ganelon, however, deceives Charlemagne with the assurance that Roland is only engaged on a deer hunt. Thence the sound of the ivory horn is heard and unanswered, but another blast, the violence of which cracked Roland's temples, alarmed the emperor for the safety of his favorite warrior. He hurries up to his assistance, but it is too late; Roland, wounded in many places, has dragged himself to die at the foot of a tree, has sung his death song and thrown down his enchanted sword, Durandal, and the ivory horn, and covered them with his body. Nothing remains but to avenge the death of the hero, and this Charlemagne does in a series of bloody victories, with the narration of which the poem closes. The poems of Pulci, 'Morgante Maggiore'; of Boiardo, 'Orlando Innamorato'; and Ariosto, 'Orlando Furioso,' relate to Roland and his exploits. Consult: Einhard, 'Vita Caroli Magni'; Turpin, 'De Vita Caroli Magni et Rolandi'; Schmidt, 'Ueber die italienischen Heldengeschichten aus dem Sagenkreis Karls des Grossen' (1820).

Rolfe, rōlf, William James, American Shakespearian scholar: b. Newburyport, Mass., 10 Dec. 1827; d. 7 July 1910. Educated at Amherst, and after teaching in Wrentham, Mass., became master of the high school, Dorchester, Mass., in 1852. In 1857 he was master of the high school at Lawrence, Mass., in 1861 of the high school at Salem, Mass., and from 1866 to 1868 of the high school at Cambridge, Mass., resigning in the year last named to devote himself to literary pursuits. His Shakespearian labors began in 1867 with his editorship (with J. H. Hanson) of Craik's 'English of Shakespeare.' In 1870 he issued an annotated edition of 'The Merchant of Venice' and followed this with other annotated plays till in 1883 a complete edition of Shakespeare had appeared in 40 volumes. This is sometimes styled 'The Friendly Edition,' a name first suggested by Mary Cowden-Clarke (q.v.). He has also edited 'Select Poems of Goldsmith' (1875); Gray (1876); Browning (1887); and Wordsworth (1889); a complete edition of Scott

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(1887); and of Tennyson (1895-8), and other works, and is the author of 'Satchel Guide to Europe,' revised yearly (1872-1903); 'Shakespeare the Boy' (1896); 'Life of Shakespeare' (1902). He lectured much upon Shakespeare and literature in general and in his editions of Shakespeare and other poets he admirably preserved the balance between textual and literary criticism.

Roll, rôl, Alfred Philippe, French painter: b. Paris 10 March 1847. From being a designer of patterns and decorations of various sorts he passed to the Ecole des Beaux Arts at Paris, where he was much attracted to the work of Jerome and Bonnat. The influence of both these teachers is traceable in his pictures, especially that of Bonnat in the duskiess of coloring which prevails in his 'Scenes from the Flood at Toulouse in June 1877,' a picture which gained a medal of the first class, and is now in the Havre Museum. In succeeding pictures he developed a passion for naturalism of the most uncompromising character, and in his 'Feast of Silenus' (1878) (in the Museum of Ghent), and still more in the 'Strike of the Colliers' (1880), now in the gallery of Valenciennes, and 'Labor' (a representation of masons, bricklayers, and carpenters at work on a building), this tendency is conspicuous. These are all blazing sunlight pictures, as if executed *en plein air*, and in like style are his subsequent works whether portraits, genre-groups, landscapes, or marines. They are solidly painted with a matter-of-fact air of reality which is very striking. Among his later works is a canvas crowded with figures, 'The Centennial Jubilee of the Revolution of 1789' (1893).

Rolla, Alessandro, Italian violinist and composer: b. Pavia 22 April 1757; d. Milan 15 Sept. 1841. He was active for many years as musical director at La Scala theatre and teacher in the Conservatory in Milan, and published several quartet and solo pieces as well for the violin as for the bass viol, which for essential purity of composition and perfection of form stand preeminently superior to similar works of his day.

Rolla, rôl'a, Mo., city, county-seat of Phelps County; on the Saint Louis and S. F. railroad; about 48 miles south-southeast of Jefferson City, and 110 miles southwest of Saint Louis. It is in an agricultural and iron mining region. Its chief industrial establishments are smelting furnaces, foundries, machine shops, flour and grist mills. It is the seat of the Missouri School of Mines and Metallurgy, a department of the Missouri State University (q.v.), organized in 1871. Pop. (1890) 1,592; (1900) 1,600; (1910) 1,791.

Roller, a tropical bird of the genus *Coracias*, forming the type of the family *Coraciidae*. These birds are generally of small size, and frequently exhibit brilliant colors in their plumage, and are confined in their distribution to the eastern hemisphere. The food consists partly of insects and partly of nuts and fruits. The common roller (*Coracias garrula*) is found in Africa, whence it migrates in summer northward into Europe. In size the roller equals the common jay. The back is of a light brown color. The head is bluish-green, as also are the neck and lower surfaces. The lesser coverts of the

wings are bright blue; the tail-feathers blue, with a greenish lustre. The voice is noisy and harsh. In habits these birds are shy, and frequent forest depths and secluded spots. The four pure white eggs are frequently deposited in the holes of trees or in holes in river banks. The genus *Eurystomus* is nearly similar to *Coracias*, but occupies tropical Africa. Both genera include several distinct species. Consult Evans, 'Birds' (1900).

Roller Skate, a skate patented in France as early as 1819. Since that time scarcely a year has passed without the recording of some improvement in wheel skates. Plimpton's improvement consisted in so gearing two pairs of wheels that they would "cramp" when the foot-plate was canted to either side, and thus cause the skate to move on a curved line. Several years elapsed before the value of the invention was generally recognized; but in the meantime the inventor was busy making improvements and taking out other patents and in 1874 had brought the skate practically to its present condition. This device of "cramping" the wheels secured the initial success of roller skating. The earlier inventions were crude affairs compared with the modern appliances; the present roller skate combines strength, lightness, and ease of action in a marked degree. About 1864 the mania for roller skating appeared in England; but in 1866 the "rinking" fever broke out in Australia, and spread thence to England and the United States. Since that time the craze has appeared at intervals only to again die out. The most recent of these arose in 1884-5 in the United States, but soon shared the fate of its predecessors. The most recent form has only two wheels, set one behind the other, and resembling the ice skate in its form and action.

Rollin, rô-lân, Ambrose Lucien, West Indian historian: b. Trois Rivières, Guadeloupe, 1692; d. Point à Pitre, Guadeloupe, 1749. He was appointed deputy-lieutenant of the colony in 1725, an office which he occupied until his death, and devoted himself in his leisure to researches upon the Caribes and other Indian tribes. His works show remarkable care and ability and are still accepted as authoritative. They include: 'Histoire des Indiens' (1739); 'Histoire et Description des Caraïbes, leur Condition avant la Conquête' (1734); 'Les Incas du Pérou et la Conquête Espagnole' (1748); etc.

Rollin, Charles, French historian: b. Paris 30 Jan. 1661; d. there 14 Sept. 1741. He studied theology at the Sorbonne, but did not take orders. In 1688 he obtained the chair of eloquence in the Collège de France, of which he became rector in 1694, and he there revived the study of Greek language. In 1696 he was chosen coadjutor or head of the College of Beauvais. Displaced in consequence of his connection with the Jansenists, he was reinstated in 1720. His productions are 'Traité des Etudes' (1726-31); 'Histoire Ancienne' (1730 and 1738), his best known work; and 'Histoire Romaine' (1738-48) to the war against the Cimbri (completed by Crevier and others). Rollin's writings are distinguished for purity and elegance of style, but are diffuse and prolix, and his historical works are deficient in critical sagacity. There is an edition of his works in 30 vols. (1827), with notes on the historical parts by Guizot. His 'Ancient His-

tory' has been often reprinted in English, but is now quite out of date.

Rollin, Ledru. See LEDRU-ROLLIN.

Rolling Mills are machines employed to convert masses of metal into bars or plates, and consist of a series of rollers in pairs, variously arranged, between which the metal is passed and receives successive reductions in thickness and a consequent increase in length or breadth, as the case may be. The rollers are made of steel, and are mounted on massive frames capable of withstanding enormous strains. They have plain or grooved surfaces according to the purposes for which they are employed, and are driven by powerful horizontal reversing steam-engines, by cog-wheel connections and axle gearing. Of the many purposes for which they are employed, perhaps the most important is the manufacture of rails, bridge work and other structural shapes, pipes or tubes, wire, and plates of various kinds such as armor plate, boiler plate, etc. (See **RAIL, MANUFACTURE OF**.) In the manufacture of rails, the ingot of cast metal is placed in the soaking pit and heated to a white heat. It is then taken to the blooming mill and passed through the blooming rolls seven times and reduced to a bar of a section 9 inches square, and 15 feet long which is subsequently sheared into two or three pieces, according to the length of the desired rail. These pieces called "blooms" are then heated in the bloom furnaces from which they are taken to the rail mill, which consists of a series of grooved rollers arranged in three sets — the roughing rolls, the intermediate rolls, and the finishing rolls. These rolls are placed one beyond the other and extend over an interval of about 900 feet. The hot blooms are passed through them successively. Through the roughing mill the bloom is passed five times and reduced approximately to the section of the desired rail. It is then passed through the intermediate rolls five times and brought still closer to the desired section. It is now placed upon a cooling table for a period of time ranging from 45 to 90 seconds, depending upon the weight per pound of the rail, and then passed through the finishing rolls and brought to the exact section required. After leaving the finishing rolls the rails are cut up into lengths of 30 or 60 feet, as required, then passed through the cambering rolls where they receive sufficient camber to insure of their remaining true and straight when cooled. Rail rolling mills have a capacity of turning out from 7,000 to 8,000 rails per day, requiring about 3,000 tons of metal. (See **RAILS, MANUFACTURE OF**.) In the manufacture of bridge and other structural shapes, a brief description of the rolling mills of the Pencoyd Iron Works, Pencoyd, Pa., will serve to indicate their enormous capacity. The output of their open-hearth department amounts to 46,000 tons of ingots per week. This mass of metal is converted into finished shapes by a plant of five mills — a 23-inch, three-high roll train, for rolling shapes; a 12-inch, three-high roll train, for rolling angle and T irons; a 28-inch, two-high reversing roughing mill; a 36-inch, two-high preparing mill; and a 23-inch, three-high finishing mill; each of which is driven by 30 x 36-inch double reversing engines geared directly to the mills. For use of rolling mills in wire-making, see **WIRE, MANUFACTURE OF**.

Rollins, rôl'inz, Frank West, American politician: b. Concord, N. H., 24 Feb. 1860. He was graduated from the Massachusetts Institute of Technology in 1881 and later attended the Harvard Law School. After a brief practice of the law, he became a banker in Boston. In 1884 he was elected to the New Hampshire Senate, and in 1898 was elected governor of that State. In this capacity he served two years. The idea of "Old Home Week," established in New Hampshire during his administration, and adopted by many of the older States, originated with Governor Rollins. He has published 'The Ring in the Cliff' (1877); 'Break o' Day Tales' (1895); 'The Lady of the Violets' (1898); 'Old Home Week Speeches' (1900); etc.

Rollins College, located at Winter Park, Fla.; established in 1883. It is not under direct denominational control, but is closely affiliated with the Congregationalists. It has a collegiate and preparatory department, the former conferring the degree of bachelor of arts. It is co-educational, and the number of women in attendance usually nearly equals the number of men. The grounds and buildings in 1910 were valued at about \$90,000; the library contained 8,000 volumes; the annual income was over \$60,000. The students numbered 200 in both departments, and the faculty 20.

Rollo, rôl'ô, Norwegian conqueror of Normandy: d. 930. According to tradition he was named "Walking Rolf" (Ganger Rolf), because no steed could carry him. He fought for several years in France, and finally made peace in 912, receiving from Charles the Simple for himself and his freebooting followers a tract along the Seine between the Eure and Epte. He became a Christian, was baptized at Rouen, and took the title Duke Robert. See **NORMANS**.

Romagnosi, rô-mân-yô'sê, Giovanni Domenico, Italian jurist and philosopher: b. Salso Maggiore, Italy, 13 Dec. 1761; d. Corfu 8 June 1835. He was educated at Pavia and established himself as an advocate at Trent. He was appointed professor of law at Parma in 1803 and in 1806 went to Milan to assist in preparing a code of penal procedure which was later adopted. A chair of law was established expressly for him at Milan, but after the downfall of Napoleon he lost his position. He continued to lecture until 1817 and in 1818 was tried for treason but acquitted. He subsequently supported himself by giving private lessons and continued in abject poverty until his death. Among his works are: 'La genesi del diritto penale' (1791); 'Introduzione allo studio del diritto pubblico universale' (2 vols. 1805); etc. Complete editions of his works were published in 19 volumes (1832-5) and in 15 volumes (1836-45).

Roma'ic. See **GREECE, Modern Greek Language and Literature**.

Romaika (rô-mâ'î-kâ) Dance. See **PYRRHIC DANCE**.

Romaine, rô-mân', William, English Anglican divine: b. Hartlepool, England, 25 Sept. 1714; d. London 26 July 1795. He was educated at Oxford, held several small curacies prior to 1748 when he went to London to hold a lectureship at the united parishes of St. George's, Botolph Lane and St. Botolph's, Billingsgate. In

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1749 he became attached to St. Dunstan's-in-the-West and the next year became morning preacher at St. George's, Hanover Square. He was a follower of Whitefield, an ardent evangelical, and suffered much persecution in and out of the church for his views, and on account of the congregations of the poor that he assembled. As a consequence he lost his appointments and held others but for a brief period until 1764, when he was inducted to St. Ann's Blackfriars, and was elected by the parishioners to St. Andrew of the Wardrobe. This election, though disputed, was confirmed by the court of chancery and he held the pulpit until his death. He published: 'The Life of Faith' (1763); 'The Walk of Faith' (1771); 'The Triumph of Faith' (1794).

Roman and Greek Gods. The following are among the more prominent gods in Roman and Greek mythology:

Gods	Greek	Roman
King of Gods.....	Zeus.	Jupiter.
God of Water.....	Poseidon.	Neptune.
God of the Lower Regions.	Pluto.	Pluto.
Messenger of the Gods....	Hermes.	Mercury.
God of War.....	Ares.	Mars.
The Gods' Smith.....	Hephestos.	Vulcan.
God of Light.....	Apollon.	Apollo.
Goddess of Hunting.....	Artemis.	Diana.
Goddess of Wisdom.....	Athene.	Minerva.
Queen of Heaven.....	Hera.	Juno.
Goddess of Tillage.....	Demeter.	Ceres.
Goddess of the Hearth.....	Hestia.	Vesta.
Goddess of Beauty.....	Aphrodite.	Venus.
God of Wine.....	Dionysos.	Bacchus.
God of Love.....	Eros.	Cupid.
God of Time.....	Chronos.	Saturn.
Wife of Chronos.....	Rhea.	Cybele.
Queen of Hades.....	Persephone.	Proserpina.
Goddess of the Rainbows...	Iris.	Iris.
Cup-bearer to the Gods....	Hebe.	Hebe.

See also MYTHOLOGY.

Roman Archæology. See ARCHÆOLOGY.

Roman Architecture. See ROMAN EMPIRE, ARCHITECTURE.

Roman Art. See ART.

Roman Candle. See PROJECTILES.

Roman Catacombs. The "Catacombs of Rome" is the name given to the underground cemeteries, in which were laid to rest the Christians of the Eternal City during the first four centuries. The word itself seems to be a hybrid from the Greek *kata* and the Latin *cum-bere*, and signifies "next the sepulchres." It first came into use at the end of the 3d century as a topographical term for a point of the Appian Way. In the course of time it was applied to the adjoining cemetery of Saint Sebastian, and in the Middle Ages when the other cemeteries were forgotten, it became a general designation for all the early Christian burial-places at Rome. It was a word unknown, however, to the first followers of Christ, who called the sepulchres of the saints, cemeteries, "places of sleep," owing to their faith in the Resurrection. There are some 32 of these larger early Christian cemeteries beyond the Aurelian wall, bordering the ancient Roman roads and encircling the city of the living with a silent city of the dead. The most important are the Catacombs of Priscilla on the Via

Salaria, of Calixtus on the Via Appia, of Domitilla on the Ardeatina, and the Ostrianum on the Via Nomentana. In this Roma Sotteranea there are some 550 miles of underground corridors, honeycombing the soil of the deserted Campagna, and running like streets in all directions and at every angle, now near the surface and again descending to the depth of 75 feet, expanding here into a room and there into a crypt or chapel, along whose sides the faithful were buried in rows one above the other, like the shelves of a shop, or the bunks of a vessel. The corridors average about three feet in width and six feet in height, and were dug generally in three or four levels, ranging from 30 to 50 feet below the surface of the soil. The niches, called *loci*, or *loculi*, which contained the bodies, were closed by a marble slab or a series of tiles, on which was frequently carved some inscription. To understand the origin of the Catacombs, it is necessary to keep before our minds, (1) the funeral customs and laws of Imperial Rome; (2) the early Christian mode of burial; and (3) the nature of the soil out of which sprung the famous seven hills. (1) The ancient Romans had a great reverence for their dead. *Religiosum locum unus quisque sua voluntate facit, dum mortuum infert in loco suo.* Wherever a body rested became *terra sancta*, sacred soil, subject to the authority of the pagan pontiffs. Hence burials were forbidden inside the walls, and the ways leading out of the city were lined from the first to the third milestone with the mausolea, whose richness was one of the glories of the Imperial City, as their ruins are one of the beauties of modern Rome. The pagan mausoleum consisted of three parts, the monument proper, the area or lot of ground, and the underground vault in which the ashes were placed in dove-cot niches, known as *columbaria*. These burial plots with their magnificent monuments were owned by burial societies as well as by families, and were fully protected by the law. The Christians likewise, either singly or collectively, erected their mausolea along the highways beyond the walls, and this property, even in times of persecution, was safeguarded by the majesty of Roman law. Hence it often happened that while the law spilled the blood, it spared the body of the Christian. The opinion sometime current that the bodies of the martyrs were buried by stealth, and that the pagan authorities were ignorant of the existence and extent of the Catacombs, is altogether unfounded. The Catacombs were registered under and recognized by the law. They enjoyed the privilege of sacrosanct soil. Indeed many of the bodies were interred in surface cemeteries as to-day. (2) The first faithful originated no special mode of burial. They generally followed the customs of the people among whom they lived. They adopted the Jewish practice of interring, instead of the Roman method of cremating, on account of their belief in the resurrection of the flesh. The sepulchre hewn in the rock, where the body of Christ was laid, was the resting place too of the Christian body. This was first wrapped in a tunic or winding sheet previously coated with a preparation of plaster, was covered with perfumes and flowers, and placed in one of

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the niches cut out of the subterranean crypt or along the corridor. In the case of the martyrs or wealthier converts the bodies were laid sometimes in a marble sarcophagus or in an arched grave hewn out of the rock, termed *arcosolium*, and called *bisomus* or *trisomus*; according to number of bodies it contained. (3) The soil of the Roman Campagna is of volcanic origin, and consists of three distinct sorts of tufa; (1) the lithoid tufa or peperino, a hard building stone; (2) the fine pozzalana sand used in making the Roman cement; (3) a granular tufa, of no commercial value. However this granular tufa was readily worked, and it is precisely in this strata that we find the Catacombs. The workmen followed these veins in excavating, thence the apparent confusion of the courses and distance of the depths. It was thought at one time that the Catacombs, like the arenaria, were excavated for building purposes, but modern research has shown that they are of distinctively Christian origin, and have nothing in common with the arenaria either in mode or material of construction.

Origin.—The genesis of the grave among the faithful at Rome was something like this. The wealthier Christians owned their burial lots along the public roads leading out of the city. They had their monument fronting the way, marked with the name of the family. Thus for instance was the case with "Sepulchrum Flavium" on the Ardeatine Way. The crypt beneath instead of being fashioned into a columbarium, had the graves cut out of the soil. At first this crypt was placed at the disposal of the brethren of the *Ecclesia Fratrum*, and as the number of burials increased, the crypt was gradually extended under the entire surface of the lot. Thus the Catacombs in the first and second centuries were little more than the private burial vaults of the wealthier Christian converts. These original centres of excavation have been recognized in many cases, as for instance, the crypt of Lucina in Calixtus, the Greek Chapel in Priscilla, and the *Spelunca magna* in Prætextatus. At the beginning of the 3d century, the cemeteries passed from private to Pontifical control. About the year 197, Zephyrinus appointed the deacon Calixtus to take them in charge, and the latter has bequeathed his name to the best known of them, which became the official burying place of the Bishops of Rome in the 3d century, and contains the famous papal crypt. Henceforth the Catacombs were owned and administered by the Church. Each one of the 25 parishes in which Ecclesiastical Rome was divided in the 3d and 4th centuries had, roughly speaking, its corresponding cemetery. The identification of the tituli and the cemeteries has been established in a number of instances. With the increasing number of the faithful were formed burial societies among the brethren, which, like the pagan societies, provided by the payment of dues for the benefits of burial to deceased members. They owned their own lots, had their own houses built above the ground, in which they met to celebrate their agape and funeral feasts. Hence there was nothing incongruous in the Christians assembling at the Catacombs on stated occasions to

keep the anniversary feasts of their martyrs. Similar celebrations were held by the pagans themselves, and there is a striking resemblance between the liturgy of these pagan funeral feasts and the language of the Roman martyrology. The inviolability of the cemeteries was undisturbed even in times of persecution, save by Valerian, in 258, and Diocletian, in 303. The part played by these burial societies in the Church is still in dispute. De Rossi has advanced the theory that the Church in the 3d century owned its property as a burial society, as *Ecclesia Fratrum* or *Ecclesia Cultorum Verbi*. Duchesne, however, contends that even in period of persecution, the Church was recognized as a religious society, capable of holding property. The work of excavating was under the care of a distinct class, called *fossores* or diggers. They were regarded as an inferior sort of clergy, and many of the rude inscriptions were made by them.

The Constantine Period.—It has often been said that the victory of Constantine brought the Church from the Catacombs to the Cathedral. The reverse is literally true. It was precisely in the era of peace, that the Church betook itself to the Catacombs, and that they attained their largest growth and grandeur. Everyone wished to be buried close to the martyrs of Christ. *Quod multi cupiunt et rari accipiunt*, we read in an inscription of the year 381, of one who had obtained burial near the sepulchre of the saints. The crypts of the martyrs were changed into triumphal halls of fame. They were decorated with the choicest of marbles from the wealth of the Imperial City. New corridors and entrances were cut, the old ones were joined together. Metrical hymns of praise were placed above the graves of the chief martyrs, especially by Pope Damasus. Lights were kept burning before their shrines, and thither the devout of the city were continually flocking to implore the intercession of the saints or to honor their memory. Even the great Constantine basilicas of Saint Peter on the Vatican, Saint Lawrence on the Labicana, Saint Paul on the Ostian, Saint Agnes on the Nomentana, were but triumphal canopies erected over the tombs of these Christian heroes. Toward the end of the 4th century the custom of burying in the surface cemeteries began to prevail, and after the sack of Rome by Alaric, in 410, interment in the Catacombs ceased altogether.

Period of Decline.—In the succeeding centuries they were chiefly centres of devotion and terms of pious pilgrimages from the North. The itineraries of these pilgrimages from England and Germany, some of which have been preserved, were veritable Ariadne-clues in the rediscovery of these buried labyrinths. For some time the Popes of Rome, notably Vigilius (537-555), John III. (561-574), and Honorius I. (625-638), kept the shrines in a state of repair; but after the ravages wrought in the Catacombs by the invading Lombards, Paul I. in 757 and Paschal I. in 817, translated the relics of the martyrs to churches within the walls. Despoiled of the treasures which had attracted visitors, they rapidly fell into decay. With the exception of the Catacomb of Saint Valentinian on the Flaminian, and Saint Sebastian on

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the Appian way, their very existence passed out of the minds of men in the Middle Ages.

Rediscovery and Research.—In 1587 some workmen, excavating on the Via Salaria, chanced upon a Catacomb corridor, rich in paintings and inscriptions. The interest aroused by this discovery has never since died out. Antonio Bosio (1576-1614), the Columbus of the Catacombs, devoted his life to their exploration. His 'Roma Sotterranea' is the first classic on the Catacombs. The researches made by Boldetti and Battari and others in the 18th century were mainly in the interest of controversy. To the Jesuit, Fr. Marchi, belongs the glory of having inaugurated, in 1841, a strictly scientific study of these early monuments and memorials, and the still greater glory of being the Master of Giovanni Battista de Rossi (q.v.), the father and founder of the science of Christian archaeology. By his genius and labors he explored and excavated the buried crypts and corridors of the Catacombs, established their identity and called them by name. From broken stone and damaged fresco and forgotten tomb, he gathered together the materials of a monumental Encyclopædia Romana, a storehouse of the treasures of early Christian belief and behavior.

Paintings.—In regard to the many paintings found in the Catacombs, it may be said in general, that the history of the decline of Classic is that of the beginning of Christian art. In fact nearly all the examples extant of Roman paintings in the 2d, 3d, and 4th centuries are in the Catacombs. They show us that the Church baptised the art as well as the language of the Græco-Roman world. While the themes treated for the most part have a direct reference to the grave and beyond, they still illustrate a large part of the creed of the early church. The Catacomb frescoes belong to three distinct periods. In the first and beginning of 2d century, there was properly speaking no Christian art. The methods and motifs of the pagan painter, such as abound at Pompeii, vines, garlands, flowers, fishes, fruits, birds, cupids, etc., appear likewise in the Catacombs. However even among these designs, those that were capable of symbolizing some Christian truth, as the vine, peacock, dove, and fish, predominate. In the 2d and 3d centuries, as the cemeteries pass from private to public control, a series of paintings distinctly Christian begin to appear. They are symbolical in meaning and similar in execution.

In the third epoch which corresponds to the time of peace, the pictures tend to become more and more realistic, until they are petrified in the 5th and following centuries in the rigid forms of Byzantine art.

The Biblical Cycle.—A remarkable parallel between the prayers of the Roman Breviary for the commendation of the soul in the hour of death and the Biblical Cycle of cemeterial paintings, was first pointed out by Le Blant. This correspondence is so exact as to leave little doubt that these paintings derive their inspiration from the funeral liturgies of the Church. The deliverance of Noah in the flood, of Isaac from the sacrificing hand of his father, of Daniel from the lions' den, of the three children from the fiery furnace, of Susannah

from her false accusers, of Jonah from the whale, are the ever repeated themes, and they all correspond to the liturgical prayers for the dying. The raising of Lazarus completes the Biblical Cycle, and this scene is the gospel for the Requiem Mass. Of this series Jonas and Lazarus are most frequently depicted. The designs are evidently symbolic. A man standing in a chest serves to recall Noah and the ark; the story of Jonah is often told in three scenes; the casting from the ship, the vomiting forth from the dragon fish, and the resting under the gourd. But not infrequently the last scene alone is portrayed. In the same spirit the raising of Lazarus is depicted by a man standing upright at the entrance of a tomb.

Pictures of the Saviour.—There is no likeness of Christ attempted in the Catacombs. He is represented by the symbol of the fish and the hidden cross. The fish, in Greek, *ἰχθῆς* formed the famous acrostic *Ἰησοῦς Χριστός, Θεοῦ Υἱος Σωτῆρ* (Jesus Christ Son of God Saviour) and whether written or pictured was a mystic symbol of the Saviour. The transpierced dolphin in Calixtus is the earliest copy of the Crucifixion. The disguised cross was also of frequent use, and never has this sign been in higher esteem than the first ages of the Church. It was sometimes represented thus X; again as an anchor J, now as the gamma cross T, at other times as a trident Y. The Constantine monogram X, so called from its use on the Labarum, was the common symbol of the 4th century. It was used even in inscriptions, as *in nomine X* or *in pace X*. This X was the early monogram of Christ, as IHS became the later one, of Jesus. There was no real representation of the Crucifixion till the Middle Ages. The Crucifix is the creation of the ages of faith, and not of the formative period of Christianity. The first pictures in the Catacombs represent Christ as young and beardless, but in the 5th century the Byzantine bearded face with severe features came into vogue. The picture of the Good Shepherd is the Catacomb Christ par excellence. It is found everywhere in the frescoes of the 2d, 3d, and early 4th centuries. The Saviour is represented in the garb of a young Roman shepherd, wearing the short sleeveless tunic, his right shoulder bare, his feet and legs sometimes bare, again covered with shoes and leggings. In some scenes he carries one of the flock upon his shoulders, in others he plays the pipe while they listen, in others still he leads them to pleasant pastures, but always and everywhere it is the Good Shepherd who seeks and saves. This picture of love was the reply of the Roman Church to the harsh doctrine of the Novations in the 3d century.

The Saints.—Most of the pictures of the martyrs belong to the 4th, 5th, 6th, and even 7th centuries when their graves became shrines, and were richly decorated. They are Byzantine in execution and resemble the mosaics of that period. They are valuable as witnessing the style of vestments worn by ecclesiastics of the day. The Virgin Mary appears most frequently in the Catacombs as the central figure in the Adoration of the Magi. These vary in number from two to six, but uniformly wear the Phrygian cap. The two most interesting pic-

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tures of the Madonna are in Priscilla and Ostiano. The former is a 2d century representation of the Virgin with child in her arms, with a prophet in front of them, pointing to a star. It is a picture of much grace and excellent execution. Its classic lines do not appear again in Christian art for more than a thousand years. The latter is a 4th century Madonna and child, where the *X* is placed on either side, as though it were a painted echo of the Council of Ephesus. The divine maternity of Mary was certainly in the mind of the artist, and the features of this painting are still preserved in Greek and Russian images. The saints are sometimes portrayed as "advocates" introducing into heaven the souls of those whose bodies were buried near their shrines. This ministerial mediatorship of the saints, exhibited in the Catacomb frescoes of the 3d and 4th centuries, became a common theme of the apsidal mosaics of the basilicas.

The Soul.—The soul is frequently represented by a young woman standing with arms outstretched in an attitude of prayer, called an *orans*. In paradise the soul is depicted as a bird flying among the flowers or feasting on the fruits or drinking from the chalice of heavenly delights. The celestial banquet is represented some six or seven times in Saints Pietro and Marcellino by the blessed seated at a semicircular table, feasting upon the mystic fish under the guidance of Peace and Charity. The judgment of soul standing before Christ in the presence of the martyrs, seems to be the subject of some obscure frescoes.

The Sacraments.—In the cemetery of Calixtus are a series of so-called Sacrament chapels, where the decorations are arranged to set forth a number of Christian truths. First, comes the scene of Moses (Peter) striking the rock. "And the rock was Christ." (1 Cor. x. 4.) In the mystic water of grace a small fish is being caught by the Apostolic fisherman. Tertullian has painted the thought in words. "We as little fish are born in the water after our *ixthi*, Jesus Christ." (Tert. de Bapt.) Then succeeds the Sacrament of Baptism, the source of the new life. The catechumen stands in the water, and the priest pours the laver of regeneration on his brow. Next follows the Eucharistic action, portrayed by a priest standing beside a tripod altar containing a fish and some bread, while an *orante* at the other side lifts her hands in prayer. The multiplication of the loaves and fishes and the banquet of Christ with his disciples by the sea of Tiberias next represent the Communion. And finally the resurrection as a result of the Communion is shown in the raising of Lazarus and the deliverance of Jonah. "He that eateth my flesh and drinketh my blood hath life everlasting, and I will raise him up on the last day." (John vi. 55.) There are two representations of the Eucharist worthy of remark. In the crypt of Lucina, the primitive centre of Calixtus, there are two frescoes (about 150 A.D.), in which two large fish carry on their back baskets containing bread and wine. Here Christ, the fish, the *ixthi*, bears the Eucharistic bread and wine which is himself. Saint Jerome would seem almost to speak of this scene: "No one is so rich as he who carries

the body of Christ in a wicker basket and his blood in a cup of glass" (Ep. ch. xxv. ad Rustic). Another painting of first half of 2d century, discovered by Wilpert (1894), in the archaic part of Priscilla, the Capella Græca, seems to be a real representation of the Eucharistic action of the "Breaking of the Bread." Seven persons, one of them a woman, are seated at a semicircular table, on which are two plates with five loaves and two fishes. These, however, are evidently symbolical, for the priest at the head of the table is engaged in the very act of breaking the bread, and before him sits the Eucharistic chalice. This fresco is in a chapel, and seems to be an early representation of the Eucharistic sacrifice. The representations of the other Sacraments are rare and of doubtful interpretation. A general survey of these paintings leads to the conclusion that the early Christians saw nothing in religious representations hostile to the law of Moses; that the early Church had no repugnance to art, and that the art of the Catacombs is Roman and not of Oriental origin. Mgr. Joseph Wilpert has just published an accurate and complete edition of the Pictures of the Roman Catacombs with German and Italian texts (Rome 1903).

Sculpture.—Christian sculpture barely existed before the 4th century. Catacomb conditions were not favorable to its growth. A fresco could easily be painted in the gloom of the grave, but carved marbles were at once expensive and required light and space for execution. Moreover the sarcophagi in the pagan shops were often covered with idolatrous scenes. Some of these have been found in the Catacombs with the pagan images effaced. With the era of peace, however, the faithful began to use sculptured sarcophagi, and a number of them are preserved in the Lateran Museum. As far as workmanship is concerned, they are of inferior merit, being executed at a time when art had greatly degenerated. Some of them are little less than carved creeds, containing on their façade the main mysteries of the Christian religion. They shed much light on the earlier paintings. The clear carving of the 4th and 5th centuries illumines the doubtful fresco of the 2d and 3d. In the sarcophagi, it is Peter striking the rock and Peter to whom Christ gives the law. Hence in the earlier paintings Moses typified Peter. Daniel among the lions on the sarcophagi is evidently Christ on the Cross. Hence we have a key to the early representations of this scene.

Statuary.—But few pieces of statuary have been found in the Catacombs. While idols were on all sides, the faithful seem to have held aloof from this branch of art. However several statues of the Good Shepherd were executed, and one of the 3d century preserved in the Lateran is a most beautiful representation of the subject. The sitting statue of Hippolytus of the first part of the 3d century found in the cemetery of his name, is unique among early monuments. It contains inscribed on the cathedra a list of his works and his computation of the Easter Cycle.

Gold Glasses.—The gold glasses of which many have been found in the Catacombs, consist of a design made of gold leaf, enclosed

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between two pieces of glass, ordinarily at the bottom of the glass. The subjects treated in these glasses of the 3d and 4th centuries, are of two classes. Some of them are genre pictures, ornamented with the portraits of a newly married couple or a family group, and inscribed with such toasts as "Drink! Live!" They were probably gifts for wedding and family feasts. Others used probably in the liturgical functions and perhaps as Eucharistic chalices were ornamented with the ordinary Catacomb cycle of paintings, but especially with the images of the Saints. Peter and Paul, Agnes and the Virgin Mary are the subjects most frequently represented. Eighty out of the three hundred published by Garucci portray Saints Peter and Paul. The constancy of the types, their correspondence with tradition, and the medallion of same characteristics found in Domitilla and attributed to the early part of 2d century, indicate that these are portraits of the Princes of the Apostles.

Mosaics.—There are but few mosaics in the Catacombs, and most of these of the age of peace. The mosaic is the distinctive Christian decoration of the basilica of the 5th and 6th centuries, as the fresco was of the Catacomb in the 3d and 4th.

Lamps.—The common clay lamp is the object most frequently found in the Catacombs. Most of them are in no respect different from those used by the pagans. However in the 3d and particularly in the 4th centuries, they were marked with the Christian emblems of the fish, the Constantine monogram, the Good Shepherd, the palm, etc. They illustrate the way the Christian faith entered into domestic life after the advice of the Apostle: "Whether you eat or drink—do all to the glory of God." (1 Cor. x. 31). The wine flagon and the wine cup, as well as the lamp and the loaf, were stamped with the sign of the cross in the 4th and 5th centuries. The few bronze lamps unearthed are of much more elaborate workmanship and symbolism.

Other Objects.—Rings, seals, and coins adorned with the characteristic symbols of early Christian art, have been found frequently in the excavations, as well as a number of miscellaneous objects, such as children's toys, combs, etc.

Inscriptions.—The numerous Catacomb inscriptions are of the greatest interest to the Christian scholar. The most precious of them have been arranged in the Lateran Museum by De Rossi. The bulk remains yet in the Catacombs and in the gallery of Christian inscriptions at the Vatican. They may be divided according to the method of execution into carved, painted, and "graffiti" inscriptions, the latter being writings rudely scratched on the plaster or tufa; according to time, into the original epitaphs and later laudatory inscriptions; according to language, into Greek and Latin; according to content, into dogmatic and domestic. Many of the tombs are without any inscription whatsoever, and many more are distinguished by a rude mark or some object pressed into the fresh plaster. As a rule the early epitaphs are the shorter, although brevity is a distinguishing trait of Catacomb epigraphy, in marked contrast to the lengthy pagan eulogies of the time. The name of the

departed, with a short prayer and some symbol as the fish, palm, anchor, or Constantine monogram, to which was sometimes added the date of burial and age, forms the ordinary inscription. "Gerontius, may you live in God," "Luccilla in pace"; are characteristic epitaphs. The word "deposition" is peculiar to Christian epigraphy, implying that the body is consigned but for a time to the soil. The short prayers and symbols on the tombs are in general but a reproduction of the "Memento of the Dead in the Mass," *Ipsis, Domine, locum refrigerii, lucis, et pacis, ut indulgeas, deprecamur*, "Refreshment, light, and peace grant to them, O Lord." This is the requiem chanted and carved in the Catacombs. Despite the fact that the inscriptions are sepulchral, they yet contain much matter of dogmatic and historic interest. They express belief in the unity and trinity of God, in the divinity of Christ, in the Holy Spirit, in the resurrection, and almost every article of the creed is carved on some monument. Especially strong is the testimony of the Catacombs to prayers for and to the dead. Both are sometimes found in one inscription, as this from Domitilla:

VIBAS
IN PACE ET PETE
PRO NOBIS.

"Gentianus,—pray for us because we know that thou art Christ," we read in another. "Holy Martyrs, remember Mary," comes from Aquileia. *Januaria bene refrigera et Roga pro nos*. This last inscription from Calixtus is a fair sample of Catacomb Latinity. It is ornamented with a small box, containing the rolls of the law, the customary representation of the Bible in early Christian art.

Papal Crypt.—The inscriptions of the crypt where the Popes of Rome were interred in the 3d century, are of peculiar interest.

ΑΝΤΕΨΩ Δ ΕΤΙ ΑΒΛΑΝΟΣ ΕΤΙ ΜΡ

These inscriptions show that Greek was still the official language of the Church in the 3d century. The monogram Mr, martyr, was the official canonization of the Catacombs.

Damasene Inscriptions.—Pope Damasus (304–385), the first Christian archaeologist, embellished the tombs of the martyrs with a series of metrical inscriptions, carved on large slabs of marble by his secretary, Furius Dionysius Filocalus. The texts of 40 of these are preserved in the ancient itineraries, and many of the original slabs have been discovered in the excavations of the last 50 years. The inscription of the papal crypt was found broken: in 125 small pieces, which when joined together, gave the entire text. Of all these inscriptions, but a fragment of the title at the tomb of Pope Cornelius remains in its primitive position, so thorough was the work of the devastating Lombard and destroying time. The tomb of Damasus himself, so long sought by the archaeologists, was discovered at the close of 1903 by Mgr. Wilpert. The work of excavating is still going on, but enough data has already been dug from the depths to make it certain, that whoever would go back to Christ, must pass through the corridors of the Catacombs. Here he will find the mind of the Master in

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the might of the martyr, and the love of the Saviour in the liberty of the slave. Here he will find church and Sacrament, right and ritual, creed and deed. Here he will come upon a society, Catholic in composition and in charity, Christian in faith and in hope, sleeping the sleep of peace and awaiting the resurrection of the flesh in X. The scientific study of the Catacombs has shown that the Christians were numbered in Rome by tens of thousands in the 3d century. "We are of yesterday yet we fill all that belongs to you; we leave to you only your temples." The rhetoric of Tertullian is the reality of the Catacombs. The researches of De Rossi have shown, too, that the acts of the martyrs have much more historical value than the critical school of history was formerly inclined to give them. Further and fuller research will act as *luminaria* to dissipate the darkness which controversy has gathered round the Catacombs. And when the treasures of Roma Sotterranea are all unearthed, should all other witnesses of the faith once delivered to the saints become silent, the very stones of the Catacombs will cry out to the world the wisdom and grace of Christ.

Consult: Lowrie, 'Monuments of the Early Church' (1901), gives in an appendix the best Catacomb bibliography accessible to the English reader. WILLIAM TEMPLE, D.D.,
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Roman Catholic Church. See CATHOLIC CHURCH.

Roman Catholic Church in Canada, The, will be treated in this article under three headings: 1. The Church under the French, from the discovery of Canada until the conquest by England (1534-1763); 2. The Church under the rule of Great Britain, from 1763 until the present day; 3. Present condition.

1. *Before 1763.*—Catholicism was planted in Canada by France, through whose sailors, Aubert de Dieppe (1508), Verazzano (1522), and especially Jacques Cartier (1534), it was discovered about the beginning of the 16th century. Cartier penetrated the estuary of the Saint Lawrence (10 Aug. 1535), and took possession of the country in the name of King Francis I. While endowing his fatherland with new countries, he proposed also to disseminate therein the Catholic faith, as related in the account of his travels inserted in the 'Histoire de la Nouvelle France' by Marc Lescarbot, Paris 1609.

From Cartier to Champlain (1542-1608) a few attempts at colonial settlement in Acadia was succeeded by the foundation of Port Royal (now Annapolis, N. S.). There appeared the first missionaries, Jesuits and secular priests. Champlain visited Canada in 1603, and in 1608 founded the town of Quebec and settled there. In 1615 he invited Recollet Fathers from France, who became the first apostles to the Indians, and inaugurated those missions in the interior of Canada so famous during the 17th century, and in which the Jesuits (1625) and the Sulpicians (1657), soon took such a glorious part.

Two distinct and savage races, the Algonquins and the Huron-Iroquois inhabited the countries just opening up to missionary zeal.

To the Algonquin race belonged the Abenakis the Montagnais, the Attikamègues or Poissons-Blancs, the Ottawaawas, and several other tribes scattered from Hudson Bay to the western prairies. From the Huron-Iroquois source sprang two great branches: the Yendats or Hurons established between Lakes Huron, Erie, Saint Claire, and Simcoe, and the Iroquois who dwelt south of Lake Ontario, and were divided into five nations: Mohawks, Onondagoes, Senekas, Oneidas, and Caiyoquos. It would appear that the total population of these tribes was not above 100,000 individuals.

The Recollets were the first to devote themselves to evangelization among the Indians. Father d'Olbeau instructed the Montagnais; Father Le Caron penetrated deeply into the land of the Hurons to carry them the true faith, while several fathers remained at Quebec preaching among the colonists and the surrounding savages. During ten years they multiplied their travels, their preachings, opened schools for Indian children, called to their assistance new recruits, and among them Father Viel, who perished in the Ottawa River, victim of the perfidy of a Huron. Consult: F. Sagard, 'Histoire du Canada,' Paris 1686; Ch. Beaubien, 'Histoire du Sault-au-Récollet,' Montreal 1897. Unable to fill the wants of the missions alone, the Recollets called upon the Jesuits (1625), and on their invitation Fathers Brebeuf and Lalemant with other missionaries came to Canada. Their efforts for the conversion of the savages were not attended with the success hoped for, owing to the opposition of the Company of Merchants, to whom the French king had conceded the monopoly of traffic in these regions, on the condition of founding a colony. Louis XIII. and Richelieu replaced them (1627) by the Company of New France who engaged to lead 'the people inhabiting Canada to the knowledge of God, and to instruct them in the Catholic, Apostolic and Roman religion.' There was no time to see the effects of these good intentions, for less than two years later (1629), Quebec and the colony fell into the power of David Kerth, who fought on the side of England. The missionaries and their helpers were obliged to return to France.

When Canada was returned to France by the Treaty of Saint German-en-Laye (1632), the Jesuits at the request of Cardinal de Richelieu again took up their missions. Father Lejeune organized religious service at Quebec and opened the college of that town (1635), then he plunged into the interior in search of the wandering tribes of Montagnais. Others established a mission at Miscou, and from there branched forth into the peninsula of Gaspé, into Acadia and Cape Breton. Trois Rivières and Tadousac on the banks of the Saint Lawrence became centres of evangelization. Consult 'Les Jésuites et La Nouvelle France au XVII^e siècle,' par le Père de la Rochemontaix, S. J. Paris, 1895.

Meanwhile hospital religious and Ursulines arrived at Quebec (1639), the first to direct a Hôtel-Dieu endowed by the Duchess of Aiguillon, niece of Richelieu; the second at the head of whom was Marie de l'Incarnation, to provide for the education of the girls. These heroic women were rivals in zeal for the conversion of the savages. Consult: Abbé Casgrain, 'Histoire de l'Hôtel-Dieu de Québec,' Québec, 1878;



1. Most Rev. Paul Bruchési, D.D.,
Archbishop of Montreal.

2. Most Rev. Jos. Thos. Duhamel, D.D.,
Archbishop of Ottawa.

3. Most Rev. L. N. Bégin, D.D.,
Archbishop of Quebec.

4. Most Rev. Charles Hugh Gauthier, D.D.,
Archbishop of Kingston.

5. Most Rev. Denis O'Connor, D.D.,
Archbishop of Toronto.

Id., 'Histoire de la Vénérable Marie de l'Incarnation,' Quebec, 1880; 'Lettres de Mère Marie de l'Incarnation,' Paris, 1681.

About this time the Company of Montreal was formed. Its originators were two men of God, M. Olier, founder of the Seminary of Saint Sulpice, and M. de la Dauversière, a pious laic. Its sole aim was the "glory of God and the establishment of religion in New France without charge to the clergy or to the people." Encouraged by Urban VIII., it found in Paul Chomedey de Maisonneuve a faithful executor of its intentions. This illustrious man landed on the island of Montreal which the society had acquired, 18 May 1642, and laid the foundations of Villemarie, now Montreal. With him came Mlle. Mance, foundress of the Hôtel-Dieu, and they were soon joined by Marguerite Bourgeoys, an energetic and saintly woman, who organized the religious of the Congregation of Our Lady (1653) for the education of Canadian girls. In 1657, Mr. Olier when dying, sent to the colony the first four Sulpicians: de Queylus, Souart, Gallinier and d'Allet. Consult: Dollier de Casson, S. S., 'Histoire du Montréal,' published by the Historical Society of Montreal, 1869; Faillon, S. S., 'Histoire de la colonie française en Canada,' Montreal, 1865; Id., 'Vie de la Vénérable Mère Bourgeoys'; 'Vie de Mlle. Mance,' Paris, 1854; Id., 'Vie de M. Olier, founder of the Seminary of Saint Sulpice,' 3 vols. Paris, 1873; P. Rousseau, S. S., 'Vie de Paul Chomedey de Maisonneuve,' Montreal, 1886.

The hour of martyrdom sounded for the Jesuits. After escaping twice from the ferocious Mohawks, Father Jogues died beneath their blows (1646). Two years later (1648), the flourishing mission among the Hurons was completely destroyed by the Iroquois, and five Jesuits, Fathers de Brebeuf, Daniel, Lalemant, Garnier and Chabanel, were overwhelmed in the massacre of their neophytes. Father Buteux also fell a victim to the Iroquois when going to the Attikameques (1652), and Father Bresani escaped with difficulty from these barbarians. Consult: Charlevoix, 'Histoire et Description générale de la Nouvelle France,' Paris, 1744; 'Relation des Jésuites,' Quebec, 1858; these two works with the 'Relations inédites de la Nouvelle France' (1672-1779), and other documents have been collected and published with an English translation in the edition of Reuben Thwaites, Cleveland, 1897, under the title: 'Travels and Explorations of the Jesuit missionaries in New France' (1610-1791); Parkman, 'The French pioneers in North America.' These attacks of the Iroquois became the terror of the colony. Montreal owed its salvation only to the bravery of Maisonneuve and to the heroic devotion of young Dollard, who at the head of sixteen companions for several days faced over seven hundred Iroquois, and resisted them to the death.

The year 1659 marks the commencement of the ecclesiastical hierarchy in Canada. Monsignor François de Montmorency-Laval was named Bishop of Petrea and Apostolic Vicar of New France by Alexander VII. The prelate had numerous difficulties with the governors d'Avangour and de Mézy (1663-1665) over the traffic in brandy which was causing ruin among the Indians. He opened a small seminary for

the training of future clerks, and 10 years later (1678), laid the foundations of a large seminary for preparation for the priesthood. In 1674 Quebec was created a bishopric by Clement X.; the jurisdiction of the new see extended over all North America until 1789, the year in which the bishopric of Baltimore was created. To Monsignor Laval are also due, the creation of charges with resident priests, the incorporation of the Seminary of Quebec and its union with the Seminary of Foreign Missions at Paris, the creation of a chapter of canons; in one word a good diocesan organization. He came in conflict with Governor Frontenac and Intendant Talon to maintain the rights of the Church and to extirpate the abuse of the liquor traffic.

Under his episcopacy the missionaries continued their work. The Sulpicians saw two of their number fall beneath the blows of the Iroquois at Villemarie (1663). Shortly after Messieurs Trouvé and de Salignac-Fénelon, brother of the illustrious Archbishop of Cambrai, founded the mission of Kenté (1668), at the point on Lake Ontario where debouches the Saint Lawrence. During fourteen years it was a centre whence the true faith radiated throughout all the surrounding region as far as Niagara. The following year (1669) Messieurs Dollier de Casson and Bréhan de Gallinée, Sulpicians, left Villemarie in the company of Cavalier de La Salle with the resolution of advancing west to the Mississippi. Abandoned by the discoverer they traversed alone the region of the Great Lakes, and returned to Montreal after one year of exploration and research; there M. de Gallinée prepared a relation and made a map of the expedition. We should mention also the Sulpician missions of la Montagne, Gentilly, l'Île-aux-Tourtes, and Lac-des-Deux-Montagnes, all in the environs of Montreal. The Jesuits on their side prosecuted arduously their missions. Father Menard evangelized the Outaouais, Father Alouez penetrated as far as Lake Superior (1665), and Fathers d'Ablon and Marquette planted the cross at Sault Sainte Marie. Other Jesuits joining the explorers Saint-Lusson and de La Salle, took possession of the banks of Lake Huron; and two years after (1670) Father Albanel penetrated, while traveling by the Saguenay, as far as Hudson Bay. The missions to the Iroquois were resumed, but without great success. In 1669 the sedentary mission of the Prairie de la Madeleine was founded to the south of Montreal. There expanded the lily of Canada, that Catherine Tegakouita, who died in her twenty-third year, and for whom the III. Council of Baltimore has asked the process of canonization. This mission transferred to Sault-Saint-Louis, now Caughnawaga, is still flourishing (having over 2,000 members), and after numerous vicissitudes has again come into the hands of the Jesuits. From Canada also went Joliet and Father Marquette on their discovery of the Mississippi (1673). Consult: 'Récit des voyages et découvertes du Père Marquette,' New York, 1855; Reuben Gold Thwaites, 'Father Marquette,' New York, 1902.

Recalled to Canada by Talon, the Recollet Fathers (1670) established themselves at Quebec and had four missions: Trois-Rivières, Pile Percée (Gaspé), Saint-John River and Fort Frontenac on Lake Ontario. In 1682, Mr. Dollier de Casson called them to Montreal, and in

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1692 the missions of Cape Breton and of Plaisance in Newfoundland were confided to them.

Meanwhile Monsignor Laval worn out with his administration, gave in his resignation to Louis XIV. (1684). After four years' sojourn in France, he returned to Quebec (1688), where he lived in profound retirement until his death in 1708. The episcopacy of Monsignor Laval marks one of the most prosperous epochs of the Canadian Church and of the colony. Between 1665 and 1680, thanks to the intelligent activity of Colbert and de Talon, more colonists came to Canada than in the preceding half century. A strict supervision was exercised in the choice of the young women sent, as much as regarded their physical as their moral qualities. Several whose loose manners might have become a cause of corruption and decadence rather than of growth, were rejected. Consult: Gailly de Taurines, *'La nation canadienne,'* Paris, 1894; Ferland, *'Cours d'histoire du Canada.'*

Monsignor de Saint-Vallier succeeded Monsignor Laval. The new bishop founded the general hospital of Quebec, endowed it with his own contributions, built the episcopal palace, published a catechism for the diocese, established ecclesiastical conferences, and held the first synods. In 1690, the English admiral Phipps, having attacked Quebec with 32 vessels, the prelate in a pastoral letter exhorted the Canadians to bravely do their duty. When after useless efforts the enemy had departed, the bishop dedicated to Our Lady of Victory, the church in the lower town, still standing, as a monument of Heaven's protection.

The era of great missions passed; nevertheless Cadillac and a missionary founded the town and colony of Detroit (1700); the priests of the seminary of Quebec became the apostles of the Tamarois, between the Illinois and the Ohio Rivers; the Jesuits evangelized the Miamis, the Sioux, the Otawawas, the Illinois, and held their ground amid the Iroquois. With the opening of the 18th century, commenced the furious and repeated assaults of England and its American colonies against the little Catholic colony, in which the French Government, careless of the future, became less and less interested. The emigration to New France ceased toward the end of the preceding century. No more were to be seen the great convoys setting sail for America crowded with new populations full of faith and energy. In 1713 the French Canadian population was 18,000, and in 1739 scarcely reached 42,000. It was a small number to resist an adversary which counted in 1706 260,000 individuals, and which was increasing each year.

Acadia especially was weak, having but two thousand inhabitants of French origin. The first attacks were directed against her. After having resisted in 1704 and in 1707, she fell (1710) into the power of the English colonists, and three years later, the Treaty of Utrecht (q.v.) (1713) ceded Acadia, Newfoundland, and Hudson Bay to England. From this epoch to that of the violent dispersal of the Acadians by Lawrence (1755), the Catholics found devoted support in the Sulpicians and the priests of the seminary of Quebec who were their missionaries. The names of Geoffroy, Baudoin, Trouvé, de Breslay, Metivier, de la Gondalie, de Miniac, Chauvreuse, and Desenclaves, of

Saint-Sulpice; of Petit, Thury, Gaulin, of the seminary of Quebec, deserve to be remembered by posterity. Mention should also be made of Father Rasles, S. J., missionary to the Abenakis, who was killed by the English. We will not recall here the incredible atrocities which have relegated Lawrence's memory to the execration of humanity, and which Longfellow has immortalized in his touching poem 'Evangeline.' Consult: Richard, *'Acadia, Missing Links of a Lost Chapter of American History,'* (Montreal, 1895); Abbé Casgrain, *'Les Sulpiciens en Acadie'* (Quebec 1897); Id., *'Un pèlerinage au pays d'Evangeline'* (Quebec, 1885).

These painful events only too plainly foreshadowed the fate awaiting the Canadian colony. Instead of sending men, France persisted in raising at great expense useless fortifications at Louisbourg and at Quebec. Canada was to fall through lack of foresight.

The episcopacy of Monsignor de Saint-Vallier lasted until 1727. The endowments with which he enriched the various religious establishments of the country, have been estimated at \$600,000. His successor, Monsignor Duplessis-Mornay, never came to Canada. He governed his diocese by an administrator. Resigning in 1773, he was replaced by Monsignor Dosquet who devoted himself to promoting the education of youth and the religious life in the communities. Monsignor de Lauberivière who succeeded him, died a month after his arrival in his diocese, victim of his charity in attending soldiers attacked with scurvy (1740). His successor was Monsignor de Pontbriand (1741-1760), the last bishop under the French régime. He built a cathedral, restored the Ursuline monastery at Trois-Rivières and the Hôtel-Dieu of Quebec, which had been destroyed by fire, established ecclesiastical retreats, and by his science and virtue was the model of his clergy.

Among eminent priests of this epoch should be mentioned M. de Belmont, superior of Saint-Sulpice at Montreal (1701-1732), who covered the region with his liberalities and his works; M. Normant du Faradon, his successor (1732-1759), who with the Venerable Mother d'Youville shares the glory of having founded the admirable charitable institution of the Grey Sisters. Consult: Faillon, S. S., *'Vie de la Vénérable Mère d'Youville'* (Montreal, 1852). To Saint-Sulpice belonged also that abbé Picquet to whom the town of Ogdensburg erected (1899) a monument, as well as to its founder. Consult: *'Lettres édifiantes et curieuses'* (Lyon 1819); *'Mémoire sur la vie de M. Picquet'* by M. de la Lande, of the Academy of Sciences, p. 262; *'Biographie universelle ancienne et moderne'* (Paris 1823, Vol. XXXIV. p. 289); *'Revue canadienne, janvier et février 1870,'* Vol. VII.; *'l'abbé Picquet,'* by J. Tassé.

The events which precipitated the fall of Canada are well known. Quebec taken (1759), the bishop died at Montreal (1760) without seeing that town in the hands of the English. M. Briand undertook the administration of the region of Quebec; M. de Montgolfier, Sulpician, of that of Montreal. The Treaty of Paris which ceded Canada to England was signed 10 Feb. 1763. The period of establishment closed for the Canadian Church, and that of conflicts and of progress opened.

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2. *After 1763.*—All the natural chiefs of the Canadians recrossed the ocean with the French flag. A population of 70,000 souls was abandoned without a guide. The clergy alone remained, invested with the double mission to preserve the ancestral faith and direct the people in the attainment of their civil and political rights. They understood their mission and it can be truthfully said that they did not fail therein.

The Treaty of Paris, it is true, guaranteed the Canadians "the free exercise of their religion," but with the addition "so much as the laws of Great Britain will permit." This restriction left a great latitude in the interpretation of the treaty. In fact it was a species of persecution. The government of London thought to substitute the Anglican hierarchy and religion for the Catholic hierarchy and religion and flattered itself in easily overcoming the conscience of a handful of colonials. The French laws were abolished and the oath of allegiance exacted from all Canadians. They notified the priests that they would have to subscribe to it or prepare to leave Canada. It was a demand to abjure and rebel against the authority of the Roman See. At the same time they prepared a list of the churches, the priests, their charges, their revenues, their property, also one of the religious communities with their constitutions, rights, privileges, and properties. In addition George III. encouraged the governors to found Protestant schools so that the Church of England could be established in principle and in practice, and the inhabitants gradually be brought to embrace the Protestant religion, and their children educated in the principles of that religion.

The communities of men were also condemned to die out. Recollets, Jesuits, and Sulpicians were prohibited from recruiting in the country or from receiving members from abroad. They took possession of the properties of the first, and as to the Sulpicians, they were reduced from 30 which they were in 1760, to two septuagenarians, whose deaths they awaited to take possession of their effects, when the French Revolution broke out. The English Government then relaxed its rigorous attitude and offered the victims of the furious revolutionists an hospitality which does them honor. The people though were not better treated. For them there were no public positions, no place in the councils of the colony. A species of ostracism followed them everywhere. In the midst of these painful conjunctions the Catholics did not despair; they sent to London petition upon petition claiming on the faith of the treaties the preservation of their religion, their priests, their language, and their civil rights. At last in 1766, George III. consented to the consecration of Monsignor Briand, as Bishop of Quebec, without recognizing any other title, however, than that of Superintendent of the Catholic cult.

Meanwhile a storm was arising in the Anglo-American colonies. The metropolis understood that it should conciliate the Canadians. The Act of Quebec (1774) restored the French civil laws, dispensed with the test-oath, and recognized their civil and political rights. During the war which followed and which terminated with the death of Montgomery (1775)

under the walls of Quebec, the Canadian people, docile to the voice of their clergy, remained faithful to the sovereign which Providence had given them.

During these years the Catholic population had grown: in 1784, it numbered 130,000 French-Canadians; the Maritime Provinces were being peopled by Irish and Scotch Catholics, and the Acadians dispersed in 1755, were grouping silently and multiplying, supported by such apostles as the abbés, Desjardins, Sigogne, de Calonne, and Ciquart, Sulpician. "To these confessors of the faith the Acadian race owed its organization; these were the true founders of its nationality." Consult: 'Vie de l'abbé de Calonne,' (Trois-Rivières, 1892); Casgrain, 'Pèlerinage au pays d'Évangéline.'

After having courageously combated, Monsignor Briand died in 1784. His successor, Monsignor d'Esglis, was an old man of 75 years. He speedily took a coadjutor in the person of Monsignor François Hubert, who became titular bishop in 1788. In a remarkable memoir to the Holy See (1794), the prelate states that his diocese contained 160,000 Catholics; that the efforts of the Anglicans to win the Canadians to their religion were in vain; that his diocese is too vast for him to administer conveniently. But, he added "every plan of division would find insurmountable obstacles on the part of Great Britain which is occupied on the other side in the means to establish in this country a Protestant clergy." Consult: 'Mandements des évêques de Québec,' Vol. XI., p. 474.

Monsignor Denaut (1797-1806), succeeded Monsignor Hubert. Under his episcopacy the fight against Anglicanism is summed up in the Royal Institution. Thus was named a cleverly composed organization designed to monopolize instruction of every degree by concentrating the power in the hands of the governor. The Anglican Bishop Mountain was chosen as president of the Institution. Profiting by a legal restriction the Catholics prevented its success. Consult: S. Pagnuelo, 'Études historiques et légales sur la liberté religieuse en Canada,' (Montreal, 1872).

From 1806 to 1825 the episcopal see of Quebec was occupied by Monsignor Octave Plessis, a prelate distinguished as much by the breadth of his intelligence and the force of his character, as by his courtesy in all proceedings. He had to hold his own against a powerful oligarchy which would not recoil from extreme measures, and which was resolved to make the Church the vassal of the civil power, the slave of the government; in fact to insensibly lead Canada to Anglicanism by the governmental channel. The soul of this plan was a certain Witzius Ryland, secretary of the governors of Canada from 1790 to 1812. It would take too long to enter into the details of this struggle, into which Sir James Craig was weak enough to enter; it suffices to say that Monsignor Plessis by his individuality embodied Canadian resistance without ever wounding English sentiment; that he obtained for himself official recognition of his title, Bishop of Quebec (1813); that he removed the pretensions of the government to nominate rectors; that he ensured the independence of the Church against the State; and that he inspired his adversaries even, with respect and admiration for his great

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character. Faithful besides to the Crown of England, his was the act of a loyal subject in calling to arms his diocesans, on the occasion of the invasion of the United States in 1812. Well and justly could Lord Bathurst reply to the Anglican Bishop of Quebec, J. Mountain, who protested against the favors accorded Monsignor Plessis by the London Government. "It is not when Canadians are fighting for England that such questions should be agitated." Consult: Pagnuelo, 'Études sur la liberté religieuse en Canada,' c. IX.-XI., p. 86-120; 'Le Correspondant,' April, 1877; 'La France Canadienne,' by J. Guérard; Garneau, 'Histoire du Canada,' t. III. r. XIII. c. II. and t. XIV. c. I.; 'Mandements des évêques de Québec,' t. III.; 'Conversation entre Sir J. Craig et Mgr. Plessis,' p. 59; 'Mémoire au gouverneur,' p. 79; French 'Biographical notice of J. O. Plessis, Bishop of Quebec,' (Quebec, 1864); L. O. David, 'Biographies et portraits,' (Montreal, 1876, p. 80); Bédard, 'Histoire de Cinquante ans,' (1791-1841), (Quebec, 1869, c. IV. et V.).

Monsignor Plessis understood the necessity for dividing his vast diocese. Already in 1817 New Scotland was detached with Monsignor E. Burke as Apostolic-Vicar. This did not suffice. Soon the Apostolic-Vicariates were created of Upper Canada with Monsignor MacDonell as titular; of New Brunswick and Prince Edward's Island, with Monsignor MacEachern; of the Northwest with Monsignor Provencher; of the district of Montreal with Monsignor Lartigue, Sulpician (1820). These divisions were completed after the death of Monsignor Plessis, by the creation of the sees of Kingston (1826); Charlottetown (1829); and of Montreal (1836).

In the course of years the number of French-Canadians kept on increasing. In 1831 it attained 380,000. In less than 50 years, it had increased by nearly 280,000 souls. This progress was not of a nature to reassure the intolerant and exclusive set which existed on the side of the Anglo-Protestants. Already, about 1820, they had tried to abolish the constitution of 1791, which assured an independent existence to the Province of Quebec, and wished to unite Upper and Lower Canada, with the scarcely veiled object of outnumbering the French Catholic population. This plan had failed, thanks to the firmness of Bishop Plessis and his clergy, who rallying the forces of the country, victoriously opposed Protestantism. Unfortunately, after the death of the bishop, several influential members of the legislative body deserting the sure ground of legal resistance, slipped upon the slope of revolution, fanned the spirit of revolt by their indignant philippics, and provoked the troubles of 1837-8, when several hundred countrymen led astray by their representatives, flew to arms. Nevertheless, let us say that the voice of the Catholic clergy was sufficiently powerful to keep the mass of the population in the path of duty. The result of this insurrectional movement was the union of the two Canadas. The Act of Union was passed by the Britannic Parliament 23 July 1840.

Before this act of despotism (consult Turcotte, 'Le Canada sous l'Union,' p. 60), which marks an important date in the history of Canada, several works had been created, several

deeds accomplished which interest the Church. The seats of education had multiplied: the college of Montreal (1767) founded by M. Curat-teau, priest of Saint-Sulpice, and then (1806-28) so prosperous under the direction of M. Roques; the colleges of Saint-Hyacinthe (1809), of Sainte-Thérèse (1825), of l'Assomption (1832), of Sainte-Anne de la Pocatière (1829). Mention should be made also of the formation of the Société d'éducation of Quebec, to promote primary instruction, and the acceptance of the Factory Law (1824), so favorable towards the same end. To this same period belongs the acknowledgment of the properties of the Seminary of Saint-Sulpice at Montreal by the government of Queen Victoria (1839). This act of justice allowed this venerable institution to follow the course of its charities and to cover the Montreal region with its intelligent liberalities.

To Monsignor Panet, who had replaced Monsignor Plessis (1825-1832), succeeded Monsignor Signay. His episcopacy was marked by many misfortunes: cholera (1834), civil war (1837-8), two fires in Quebec (1845), typhus brought by the Irish driven from their country (1847). The 15 years which followed 1840 were more fruitful for the Canadian Church. Five communities of men, and 15 of women dedicated to the ministry, to teaching, or to charity, came from France to settle in Canada. The Oblate Fathers of the Immaculate Mary (1841), the Jesuits (1842), the clerks of Saint-Viateur, the Congregation of Sainte-Croix (1847), and the Brothers of the Christian Schools answered to the call of Monsignor Ignace Bourget, Bishop of Montreal (1840-79). Then were founded the Sisters of Providence (1843), of the Holy Names of Jesus and Mary (1843), of Mercy (1848), of Saint Anne (1849). At the same time the episcopal sees were multiplied: Toronto with Monsignor de Charbonnel, S. S. (1842); Saint John, N. B. (1842). Quebec elevated to the dignity of an archbishopric received as suffragan sees Montreal, Kingston, and Toronto. The same year (1844) the bishopric of Arichat, N. S., transferred to Antigonish since 1886, was created: in 1847 the see of Bytown or Ottawa and of Saint John, Newfoundland. United in council at Quebec (1851), the bishops decide on the foundation of Laval University and ask the Holy See to establish the sees of Trois Rivières and Saint Hyacinthe (1852). Let us mention also the foundation of societies for colonization, for temperance, of Saint-Vincent de Paul, and of an educational system for separate schools for Catholics.

Meanwhile the Catholic population had increased considerably. In the Province of Quebec it more than doubled in 30 years; in 1831 it counted 425,000, in 1861, 942,800 souls; in Ontario it attained 260,000. This development demanded the multiplication of primary schools. This was the work of J. B. Meilleur, of whom it can be said, "he undertook the direction of Public Instruction from its cradle; that he had to create everything even to the love of instruction among the people." Consult: J. B. Meilleur, 'Mémorial sur l'éducation au Bas-Canada,' Quebec, 1876. The Catholic colleges were opened of Joliette (1846), of Rigaud (1850), of Saint-Lawrence (1847), of Saint Mary of Monnoir and Levis (1853). That

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same year (1853), the Seminary of Quebec undertook the heavy but glorious task to build Laval University which was inaugurated in the presence of Lord Elgin, 14 September 1853, and which since has rendered such immense services to the Catholic cause and to the country. Consult: C. Roy, 'L'Université Laval et les fêtes du Cinquantenaire,' Quebec, 1903.

While these works were being accomplished in the East, the West was opening to evangelization. With Monsignor Provencher, the first apostles of these districts had penetrated along the Red River. Wishing to ensure the future of these missions, the Bishop of Saint-Boniface called to his assistance the Oblate Fathers and even chose from them Father Taché as coadjutor. Monsignor Provencher died in 1853 and was succeeded by Mgr. Taché. He had to expend his intelligence and his strength during 40 years (1853-94). It does not enter into the limited scope of this essay to recount the works of the Oblates in the Far West; although they constitute one of the most remarkable chapters of the Catholic missions. The apostolic-vicariates and the episcopal sees embrace in their jurisdiction every point in these distant regions which came under the indefatigable zeal of these missionaries.

Consult: G. Dugas, 'Monsieur Provencher et les Missions de la Rivière-Rouge,' Montreal 1889; Piolet, S. J., 'Les missions Catholiques françaises,' Paris 1902; Monsignor Taché, 'Vingt années de missions dans le Nord-Ouest de l'Amérique,' Montreal, 1869; Don Benoit, 'Vie de Monsigneur Taché,' Saint Boniface, 1904; Père Jonquet, O. M. I., 'Vie de Monsigneur Grandin,' Montreal, 1904; R. Cooke, O. M. I., 'Sketches of the Life of Monsignor de Mazenod,' London, 1879.

The years which followed 1860 were full of solicitude for the Catholic clergy. The Councils of Quebec show us the bishops preoccupied with the progress of impiety, with evil books, with the weakening of the faith, and painfully affected by the events which led to the invasion of the Pontifical domains by the armies of Victor Emmanuel. The Canadians flew to arms and several detachments of zouaves offered their services to Pope Pius IX. (1868).

The Catholic hierarchy had developed in the course of years. In 1852, Halifax was created an archbishopric with Charlottetown, Saint John, N. B., Arichat, N. S., and soon after Chatham, N. B. (1860), as suffragan sees. The year 1871 marked the creation of the ecclesiastical province of Saint Boniface (Manitoba), with the bishopric of Saint Albert (1871), and the apostolic-vicariates of Athabasca-Mackenzie and of Saskatchewan for suffragans. In the preceding year (1870) Upper Canada was created an ecclesiastical province with Toronto for archbishopric and Kingston and Hamilton for suffragans. Since then Kingston has become an archiepiscopal see (1878) with two suffragans: Peterboro (1882) and Alexandria (1890). In the province of Quebec, Sherbrooke (1874), Chicoutimi (1878), Nicolet (1885) became bishoprics. In 1886, Montreal was created an archbishopric under Monsignor Fabre, with Saint Hyacinthe and Sherbrooke as suffragans, to which have since been added Valleyfield (1893), and Joliette (1904). The same year Leo XIII. created the ecclesiastical province of

Ottawa, which received as suffragan the episcopal see of Pembroke (1898). To crown this flourishing hierarchy, Leo XIII. honored with the cardinal purple Monsignor Taschereau, Archbishop of Quebec (1886). To conclude the study of the second half of the 19th century, mention must be made of three particular points. *a.* The Awakening of the Acadian Race, which had expanded imperceptibly.—From the 25,000 that they were in 1815, the Acadians increased to the number of 80,000 (1864), and 125,000 (1899). To Father Lefebvre, a Canadian priest, is due the merit of having amalgamated them and, in founding the college of Memramcook, N. B., of having contributed powerfully to render them a force for Catholicism in the Maritime Provinces. To-day the Catholics of French origin in that region amount to 155,000. Consult: P. Poirier, 'Le Père Lefebvre et l'Acadie,' Montreal, 1898. *b.* The Schools of New Brunswick and of Manitoba.—In 1867 when the Canadian Confederation was founded, the educational system of New Brunswick allowed the Catholics of that province to have separate schools. This right was refused them in 1871, the aim being to compel them to send their children to the public schools, that is to say, Protestant schools. An organized resistance spread everywhere and to avoid a sanguinary conflict, a compromise was effected. The unjust law was not abrogated but the concessions were of such a nature that peace was re-established (1874).

An injustice of the same kind wronged the Manitoban Catholics in 1890. Despite the vigorous fight led by Monsignor Langevin, successor to Monsignor Taché in the see of Saint Boniface, the iniquity was not amended, but a compromise was arranged between the Laurier Government and the Holy See, which for want of a better, softened without destroying the disastrous effects of the law. This question which so impassioned the minds in 1896 gave rise to the creation of the Apostolic Delegation to Canada, a post first occupied by the present Secretary of State to Pius X., Cardinal Merry del Val, and now, by Monsignor Donato Sbarretti, ex-archbishop of Havana, who succeeded (1902) to Mgr. Diomede Falconio, presently apostolic delegate to the United States. *c.* The foundation of Laval University at Montreal.—For a long time Montreal was in want of a Catholic university. Monsignor Bourget applied to the Propaganda. Not to injure the rights of Quebec, a branch in Montreal was granted by the pontifical bull *Inter varias sollicitudines* (1876). The powers and the autonomy of this branch were signally increased by Leo XIII. (1889). In need of the necessary buildings, the liberality of the Seminary of Saint Sulpice, governed then by M. Colin, filled this void. Laval University at Montreal now has spacious premises and numerous professorships.

3. *Present Condition.*—(a) Ecclesiastical provinces.—The total Catholic population in Canada is estimated at 2,230,008 by the census of 1901. Since then it has increased about 100,000 through immigration. With 1,430,000 Catholics, the province of Quebec alone comprises three-fifths of the faithful followers of Rome in Canada. Nearly 900,000 are scattered throughout the other provinces. Everywhere, except in Ontario, in Manitoba and in British

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Columbia, Catholicism exceeds in the number of its adherents any of the separate Protestant sects. It embraces 42 per cent of the total population of the Dominion, which is 5,371,315. From 1890 to 1900 the Catholics increased by over 250,000 souls. This gain was effected despite a very pronounced emigration movement of French Canadians to the Northeast of the United States. The following table gives at a glance the ecclesiastical divisions of the Dominion of Canada:

ARCHBISHOPRICS SUFFRAGAN BISHOPRICS	Titulars in 1904	Catholics	Priests	Churches and Chapels
QUEBEC	L. N. Bégin....	325,000	550	240
Trois-Rivières	F. X. Cloutier..	76,800	110	70
Rimouski	A. Blais.....	99,140	128	116
Chicoutimi	T. Labrecque...	60,000	100	60
Nicolet	H. Brunault....	83,824	118	62
Préf. Apost. du Bas St Laurent	P. Blanche.....	9,650	14	29
MONTREAL	P. Bruchési....	435,000	640	220
Saint Hyacinthe	M. Décelles...	115,000	230	220
Sherbrooke	L. Larocque...	67,000	149	62
Valleyfield	M. Emard.....	65,000	139	39
Joliette	J. A. Archambault	65,000	86	42
OTTAWA	J. Duhamel....	140,000	240	123
Pembroke	N. Lorrain.....	50,000	46	46
TORONTO	D. O'Connor....	65,000	103	87
Hamilton	J. Dowling.....	50,000	60	55
London	P. McEvay.....	60,000	75	77
KINGSTON	G. Gauthier....	45,000	51	69
Peterboro	R. O'Connor....	50,000	59	97
Alexandria	A. Macdonnell..	25,000	19	19
HALIFAX	G. O'Brien.....	55,000	66	86
Charlottetown	G. McDonald....	52,000	45	45
Saint Jean	T. Casey.....	58,000	63	93
Antigonish	J. Cameron.....	75,000	85	
Chatham	T. Barry.....	60,000	71	
SAINT BONIFACE ...	A. Langevin....	65,000	150	151
Saint Albert	E. Legal.....	16,000	53	
Athabaska (V. Ap.)	E. Grouard.....	10,000	10	
Saskatchewan (V. Ap.)	A. Pascal.....	15,000	24	
VANCOUVER	B. Orth.....	10,000	25	20
New Westminster	A. Dotenwill....	25,000	45	
Mackenzie-et-Yukon (V. Ap.)	G. Breynat.....	8,000	22	

On the death of a bishop, the bishops of the province send a list of three names to Rome and the Pope chooses and names a successor. The bishop-designate cannot be consecrated before receiving his bull from the Holy See. He enters immediately on his functions without having to fulfill any civil formality, and the diocesans render their homage and obedience as to his predecessor. The State recognizes in him the rights of a civil corporation. He enjoys besides, the greatest liberty while regarding canonical rules, in nominating vicars, creating parishes, erecting churches and parsonages. Each vicar keeps a registry of births, marriages and deaths. In French-Canada the vicar has the right of tithes for his maintenance. This tithe in spite of its name is but a twenty-sixth part; it is raised on grain alone, and the tendency is more and more to pay it in money. No vicar is irremovable.

(b) Religious Communities.—There are today in Canada more than 20 communities of men, eight of Brothers, and 62 of religious. They devote themselves to various forms of charity, of teaching, to parochial ministry or to preaching. They include Sulpicians, Jesuits, the Oblate Fathers of Mary the Immaculate, the clerks of Saint Viator, Dominicans, Franciscans, Redemptorists, the Fathers of the Holy Cross, of the Company of Mary, Eudistes, Basilians, of the Holy Sacrament, and several others. The Brothers of the Christian Schools to the number of 600, have 36 establishments, and instruct 20,000 pupils. The Sisters are to be found in every kind of devoted work: hospitals, asylums, industrial schools, alms-houses, refuges, orphanages, in one word all the miseries that the crowded cities multiply find succor from them. Mention will be made only of the orders founded in Canada:

NAMES	Diocese	Year of foundation	No. of Members	Houses
Congregation of Our Lady	Montreal	1659	1445	121
	Montreal	1747	950	58
	Quebec	1849	800	39
	St. Hyacinthe	1840	160	12
	Ottawa	1845	560	36
Grey Sisters (divided since 1854)	St. Hyacinthe	1840	160	12
	Ottawa	1845	560	36
Sisters of Providence	Montreal	1843	1660	78
of Jesus and Mary	Montreal	1843	1050	89
of the Holy Cross	Montreal	1847	582	33
of Mercy	Montreal	1848	150	7
of Saint Anne	Montreal	1850	830	54
Servants of the Imm. Heart of Mary	Quebec	1850	340	26
of the Assumption	Nicolet	1853	335	32
Religions of the Holy Family	Sherbrooke	1887	200	
of the Precious Blood	Saint Hyacinthe	1861	200	70

(c) Universities and Seminaries.—There are three Catholic universities in Canada: Laval in Quebec, Laval in Montreal, and the University of Ottawa, founded by Monsignor Guigues. The first two comprise all faculties except sciences. Medicine, law, and letters have well endowed chairs. Theology has distinctive faculties in the great seminaries of Quebec and of Montreal, the last opened by the Sulpicians in 1840. The University of Ottawa has only the faculties of theology and arts. Secondary education is disseminated by 17 colleges in the province of Quebec, all affiliated to Laval University which alone confers university degrees. Young men destined for the priesthood prepare by two years of philosophy and four of theology. This preparation begins in a great seminary; that of Montreal has nearly 300 aspirants for the priesthood, that of Quebec over 100. There is besides, one at Halifax; and each religious community of men is endowed with an academy where dogmatic and moral theology, the Holy Scriptures, Patrology, Canon Law, Church History and the pastorate are taught. Those young priests who are most distinguished for their intelligence are sent by their bishops to Rome to the Canadian College, founded by the Sulpicians in 1838, where they follow courses given by learned professors of the Roman universities and return with the

degrees of Doctors in Philosophy, in Divinity, or in Canon Law. Consult: Castelli Hopkins, 'Canada: an Encyclopedia of the Country,' Vol. V. (Toronto, 1898).

French-Canadian Catholics believe that they have been called by Providence to personate on American soil the rôle that France personated in the Old World. They look upon themselves as destined to fill a mission, and that mission the one that France has filled in Europe; to carry high the banner of the Catholic Church, and among races more inclined to positivism, maintain and propagate the instinct of disinterested devotion, and the worship of the ideal. Consult: Casgrain, 'Histoire de la Vénérable de l'Incarnation,' t. I. p. 95; Gailly de Taurines, 'La nation Canadienne,' ch. XXV., p. 280-291; Masson, 'Le Canada français et la Providence' (Quebec, 1875); P. Ragey, 'Une nouvelle France' (Paris, 1902).

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Roman Catholic Education. See EDUCATION, ROMAN CATHOLIC.

Roman Catholic Emancipation, the abolition of those civil and ecclesiastical restraints to which the Roman Catholics of Great Britain, and particularly of Ireland, were once subjected. By the statutes of William III. Roman Catholics were forbidden to hold property in land, and their spiritual instructors were open to the penalties of felony; and although latterly these restrictions had not been enforced, they remained unrepealed in England until 1778. See EMANCIPATION, CATHOLIC.

Roman Empire, Architecture of the. The ancient buildings of the city of Rome had little influence over the wealthy nobles, the provincial governors, the newly enriched generals of the later republic. The old Etruscan system of building, with much painted terra-cotta and with rude sculpture of a type which must have seemed to them very provincial and very archaic, too, when contrasted with the works of Greek civilization, could all be disregarded by men who had learned in the school of that civilization what the elegance, the finish and the perfect technique of Hellenic artists could produce.

Yet this influence is not to be avoided in view of the fact that all trace is lost of the republican buildings of Rome except some masses of the old Servian wall, the substructure of the tabularium and the like, which have kept their places by sheer inertia and on account of their immovable mass. The business of every Roman invader of the Eastern lands was to bring away as much artistical plunder as practicable, and on his return home to build great public monuments in the Imperial City itself as nearly in the Greek taste as he could. This again is an inference, but is irresistible in view of the abundant remains which we have of the period from 150 to 50 B.C., and of what is said about the period by its own writers. We have less power of judging of the buildings built in the provinces under Roman direction at this early period. Probably those buildings were not numerous nor often important. It was not until the civil wars had been closed and the peaceful administration of the empire was assured, first under the Dictator Julius, and

then under his nephew, Perpetual Tribune and Perpetual Prince of the Senate, Octavius, that Roman buildings, properly so called, because constructed in accordance with the central authority on the Tiber, appeared in the different parts of the Mediterranean world. It was in 54 B.C. that L. Æmilius Paulus began his great basilica at the northeast of the Roman Forum and intended as a second forum—an enlargement of the public space for the meeting of citizens. Julius (murdered in 44 B.C.) began his basilica, which was finished by Augustus, who also cleared away older buildings and built and adorned a new forum north of the Forum Romanum. The Forum of Augustus, with a triumphal arch, was more splendid than anything that had been seen in Rome. It contained the magnificent Temple of Mars the Avenger (Mars Ultor), and was enclosed by a lofty wall of solid cut stone masonry to shut off the humble dwellings to the north and east from the stately architectural group. The enormous *Sæpta Julia*, a larger basilica than any that had existed before, was built far to the north of the Capitol, in what was then the *Campus Martius*.

From that time on the emperors and the Senate vied with each other in the extent and magnificence of their buildings in the imperial city. These buildings were of two marked and easily distinguished classes. One class was Greek altogether in its tendencies, in the character of its construction and its design. It consisted of columnar architecture altogether, the construction being as simple as the Greek temples of earlier times. They were all of trabeated or post and beam construction, and always flat-roofed, always depending upon their colonnades for their chief architectural effect. The other class of buildings was of a nature never before seen in the world, and of unexplained origin.

It is very probable that the Alexandrian Greeks, that is to say, the Greek builders, under the successors of Alexander, and especially in the wealthy seaport city named after him on the shore of Egypt, invented this system of buildings, or rather developed it from the earlier practice of the Western Asiatics, especially the Persians of the later kingdom. This system of building was dependent upon vaulting in solid shells, either bricks or small stones being employed with what is called the "bath of mortar," that is to say, with mortar used in a semi-liquid condition and in great abundance. The result of this system of masonry is a solid, uniform, homogeneous shell, whether in walls or in the vaulted roof. It was taken over by the Roman builders at an early period of the rebuilding of the imperial city, and yet it is not ascertained at what period the earliest monuments of this style appeared in the city of Rome. It has been noted that Vitruvius, writing under the government of Octavius Augustus, never alludes to it. To him, the only writer on building of the time whose works have come down to us, building is as simple a matter as it was to a Greek; he seems to have understood only walls of brick or stone and roofs of timber. It is not possible to assert that any buildings of the character described above earlier than the Pantheon exist in Rome or in Italy, and the Pantheon as we have it, that is

to say, the cylindrical tower roofed with a low cupola 140 feet in diameter, and the largest structure of that kind in the world, is of the reign of Hadrian (117-138 A.D.). Once adopted however, this system of building prevailed immediately all over the empire, not universally, but as it seems, in the way of the officially recognized style of building whenever a spacious interior was required. And it is noticeable that this building for the interior is practically a Roman imperial invention. No Egyptian, no Babylonian or Assyrian, no Greek builder would have thought of making the interior the chief object of his care. The exterior of the monument was its essential characteristic; the interior, as is clear from the plans of the buildings, came of the necessities of construction without any serious attempt to modify them to the service of the requirements. The Roman engineer, on the other hand, desired vast halls, wide as well as long and high, and grappled with the problem of roofing these by means of masonry vaults, with a determined and seemingly unconscious courage unique in the history of the building art. Once he had developed the system of building the cylindrical or the spherical vault by means of stones laid in strong cement mortar, it seemed to be as natural to him to plan a width of 80 or 85 feet and to roof cylindrical towers nearly twice as wide, as to build the halls of more moderate dimensions.

These different systems of building were combined by the Roman engineers with extraordinary simplicity of means and with perfect success. Thus a massive wall built of squared blocks of stone without mortar exactly as would have been the practice in a Greek town four centuries earlier, would be backed up by a wall of mortar masonry. Bricks were used to face walls of solid masonry with such perfect success that those walls, of all thicknesses from nine or ten inches to many feet, were thought for years to be brick walls, although there is no such thing as an ancient brick wall in the city of Rome, and the solid mass of small stones laid in mortar and faced on either side with triangular tiles of clay exists even in the thinner partitions. Colonnades of marble shafts, capitals and epistyles were built in front of and flanking temples and palace halls, which were vaulted in the true Roman style with rubble laid in mortar, and these alternating with halls built and vaulted with almost equal boldness in cut stone as in the famous Nymphæum at Nîmes, in southern France. In making these combinations the Roman engineers were led inevitably to the mingling of their principles of design, and as they were not swayed by the strong logical and artistic sense of the Greek peoples they used this mingling of styles without perfect harmony. Thus a building of the most solid construction with all its openings spanned by arches and its roof made by a gigantic and ponderous vault would be adorned within and without by columns and entablatures, just as if the whole structure were Greek in the simplicity of its build. In later times separate columns were used to give a real or apparent support to the abutment of the vault. Thus in the great walls of the Thermæ (see THERMÆ) the groined vaults springing from nearly square piers are really supported by the walls themselves, from which the abutments project and

are supported generally in the way of corbeling: but in every case a gigantic column of Egyptian granite or similar precious material, with a capital of gilded bronze is put in to carry the line of the vault to the floor, and to give a seeming support even to that which needs none. This is the serious fault of the Roman imperial architecture, its denial in the decoration of the actual constructive nature of the work.

The Roman engineers did not look to the building itself for their final architectural effect. They used with the greatest freedom many kinds of surface decoration, ransacking the empire for splendid materials and using labor and money for the procuring of magnificent adornment. Thus a great hall in a public building would be lined with precious marbles in great slabs for the lower part of the walls; above this might come stucco surfaces modeled and embossed in reliefs of great beauty, such as those found in a tomb on the Via Latina near Rome, and very recently in a room in the Farnese garden near the Tiber. Above this again a similar finish in stucco would be carried out with deeply sunken panels and much gilding. The floor of such a hall would be of mosaic, and the pillars, whether square or circular, and the great pilasters which backed the free columns, would be of the most costly material and in enormous blocks. It is not asserted, however, that the building was designed by one artist and the decoration by another. On the contrary, the original scheme provided for all the decoration which was to be added. It is this freedom of decoration combined with an elaborate study of the interior as the chief purpose of the building, that has made the Roman imperial buildings the models from which all more recent architecture has originated. A Greek temple would be of no use as a Christian church, or as a palace hall—as a place of meeting or as a shelter for many persons; but the Roman buildings, basilicas, palaces, thermæ, and private houses, were all especially fitted to be lived in and otherwise used. The people of the West took the Roman buildings as they stood for churches and residences and buildings of state and official life; and as they built others, modified them from Roman practice only as their greatly diminished resources compelled them to do. A poor mediæval community could not build as a Roman proconsul built; the 6th century building had to be cheap and poor, with low, thin walls and a wooden roof: but still the Roman type was kept in view. In this way the Latin architecture of Italy, that of the earliest churches, took shape and was succeeded by the Romanesque (see ROMANESQUE ARCHITECTURE) for all of Europe except the Balkan Peninsula and the countries north of it. In the East another course was followed. The Roman civilization, and some part of the wealth and readiness to spend money which characterized the great empire, were retained in the empire of the East, and under these different conditions and with the powerful influence of Persia close at hand, the Byzantine architecture has lingered in the East until the present day, taking a different and generally inferior form in the hands of the Mohammedan race (see SARACENIC ARCHITECTURE), but preserving its original character where Greek Christianity has prevailed. In Western Europe, on the other hand, the

Romanesque architecture grew into Gothic; and the neo-Classic architecture followed in the 13th century, as a combination of the forms and structure which the Gothic art had made familiar to Europe, with a system influenced and largely controlled by the study of classical Roman art.

Of all the methods of architectural adornment, sculpture was the most remarkable; and the Roman architectural sculpture was a great contribution to the world's possessions of noble fine art. As early as the dictatorship of Julius, there existed in Italy a school of sculpture quite different from any matured by the Greeks. The great Altar of Peace, begun in 13 B.C. to commemorate the establishment of peace in the Mediterranean world, included a great amount of exquisite sculpture, both architectural and in the form of portrait statues. Under Trajan the art assumed a very dignified and truly architectural form, as in the reliefs of the Arch at Benevento and the still more admirable compositions preserved in the Lateran Museum at Rome. Under Marcus Aurelius large and showy reliefs recorded the transactions of his reign. The sculptures here named are all in marble, but the beautiful stucco reliefs must also be included in any examination of the sculpture of the 1st and 2d centuries.

Bibliography.—Anderson and Spiers, 'Architecture of Greece and Rome' (1902); Butler, 'Architecture and Other Arts' (1903), being Part II. of the publications of the American Archaeological Exploration to Syria in 1899-1900 (Part II. all published to 1904); Coisy, 'L'Art de Batir chez les Romains' (1883); Dennie, 'Rome of To-day and Yesterday' (1896); De Vogüé, 'Syrie Centrale, Architecture Civile et Religieuse' (1865-77); Graham and Ashbee, 'Travels in Tunisia' (1887); Graham, 'Roman Africa' (1902); Gühl and Koner, 'Das Leben der Griechen und Römer' (1882); Mau, 'Pompeii, etc.'; translated as 'Pompeii, Its Life and Art' (1899); Lanciani, 'Ancient Rome in the Light of Recent Discoveries' (1889); 'The Destruction of Ancient Rome'; 'New Tales of Old Rome' (1901); 'Pagan and Christian Rome' (1893); 'Ruins and Excavations of Ancient Rome' (1897); Middleton, 'Remains of Ancient Rome' (1892); Perry, 'Greek and Roman Sculpture' (1882); Taylor and Cresy, 'Architectural Antiquities of Rome' (1821-2); Wood and Dawkins, 'Ruins of Palmyra' (1753), 'Ruins of Baalbec' (1757); Wickhoff, 'Introduction to Die Wiener Genesis,' translated as 'Roman Art: Some of its Principles.'

RUSSELL STURGIS.

Roman Empire, Holy. See HOLY ROMAN EMPIRE.

Roman Forum. See FORUM.

Roman Law. The time of Justinian represents the beginning of Roman jurisprudence, for while laws had existed since the days of Romulus, it was during his reign and by his direction that civil jurisprudence was at last digested in the Code, the Pandects, and the Institutes.

Originally the government of Rome was in the hands of an elective king, a council composed of nobles and an assembly of the people. Matters concerning war and religion were administered by the supreme magistrate, and he alone had power to propose laws, his suggestions being debated in the Senate, and, finally, submitted to the several parishes of the city for ratification or

rejection. Among the most famous ancient legislators were Romulus, Numa, and Servius Tullius. It was to Romulus, for example, that Rome owed its first laws concerning marriage, the education of children, and the authority of parents; from Numa it obtained its law of nations and of religion, while from Servius came the civil code which balanced the rights and fortunes of the seven classes of citizens, and provided for the protection of contracts and the punishment of crimes. Later these laws were codified under the title of *Jus Papinianum*, but the work has long been lost, fragments only having been found by archaeologists.

Wise as many of these statutes may have been they were not destined to last for long, and when they became both odious and obsolete they were succeeded by the Twelve Tables, a digest that was received with such blind reverence for authority that all young Romans were compelled to commit it to memory. For centuries this stood as the "fountain of justice," and it is possible that there would have been no change for centuries to come if the new laws had not become such an intolerable grievance, permitting an almost complete divorce between law and equity. Conceived by the genius of Caesar, it remained for Hadrian to find the solution to the difficulty in the compilation of the code which, known as the Perpetual Edict, long remained the standard of civil jurisprudence in Rome.

During the four centuries that elapsed between the day of Hadrian and the reign of Justinian both public and private jurisprudence were molded by the will of the sovereign, and the custom of placing his decision on the same level as the maturely deliberate acts of the legislature resulted in the adoption of so many general and special laws that obedience might be said to have become an impossibility, until, at last, the question of the will of the sovereign was fixed by the framing of the Gregorian, the Hermogenian, and the Theodosian codes. The last named laws were compiled by a commission of eight persons appointed by Theodosius the Younger in 429, but were not published until 438, when they were established as substitutes for all the existing codes made since the reign of Constantine.

In A.D. 527, when Justinian ascended the throne, he found that the reformation of Roman jurisprudence was a labor that could no longer be postponed. During ten centuries the laws and the legal opinions that had become statutes were so numerous that they filled many thousand volumes, making it impossible for anyone to obtain, to say nothing of digesting, all of them. Judges were, therefore, often compelled to exercise their own discretion in the absence of any known law, while citizens in general were practically in absolute ignorance concerning the laws that governed them. The new Code, the Pandect, or digest, and the Institutes, or elements, were prepared by the most eminent scholars, who worked under the direction of Tribonian, a man whose versatility of knowledge can be compared only to that of Bacon. The entire compilation was completed in three years, and the ancient statutes were at once abandoned as relics of antiquity. This code was simply a digest of the previous codes of Gregorianus, Hermogenianus, and Theodosius, and the Constitutions, Rescripts, and edicts which had previously been issued, and is of importance in that it contains much ancient church history and law.

ROMAN RELIGION — ROMANCE

Roman Religion. So composite was the body of the religious beliefs of the Roman people, and so complex the elements themselves of which this composition was formed that it is impossible to name any definite source from which it may have come. It consisted of a mass of mythological traditions and customs which may be traced back, in many instances, to several common localities. These beliefs were introduced from time to time by the various peoples who formed the successive accretions to the great Roman people, and who in every notable instance brought with them into the nation their national religious beliefs, contributing part of them at least to the permanent structure of the Roman religion. And yet there are certain native elements which may be regarded as distinctively Latin, while, on the other hand, these elements themselves are nearly always paralleled in some one, or even in several, of the foreign components. To the influence of the Greeks more than to any other people the Roman religion is indebted for its structure and general complexion. And yet it will be seen that it differed from that religion in fundamental, vital respects.

Regarding Romulus and his immediate successors as the primitive founders, it will be found that distinctive contributions from the Sabines were added to the beliefs of the early settlers, and these later supplemented by the Latin and the Etruscan. The host of lesser sources can not be stated with any degree of accuracy. As hinted above many of the Latin gods bear a striking similarity to the Greek—a fact accounted for by a common origin. Thus we have the Latin Saturn, god of seeds, fruition, akin to the Greek Kronos; and Ops, wife of Saturn and goddess of earth and plenty, akin to Rhea, wife of Kronos; Jupiter, and Juno, who might be related to the Greek Zeus. More distinctively Latin are the wood-gods, Faunus and Fauna; Janus, Diana, the goddess of the hunt; Vesta, the goddess of the hearth (flame); Vulcan, the god of flame (the smithy); Fortuna, the goddess of fortune and of chance. The list is too long for enumeration. Deities which may be named as of Sabine origin are the war gods, Mars and Quirinus, the latter being more particularly a god of strife; Sol, Luna, and other gods of the heavenly bodies. Tellus, the god of the earth, was Latin, while Feronia, the goddess of the soil, was of Sabinian origin.

The Romans had a separate god, or more often sets of gods, for everything. Besides all the greater deities corresponding to the Greek beliefs there were gods and goddesses for all the lesser acts and conditions of life, for every material thing. Thus from their supreme representatives, Jupiter, Juno, and Minerva, to the Lares and Penates, the gods of the household, there was an endless procession of deities of every grade and power.

Worshipping at first directly and freely to these gods themselves the Romans maintained in their religious dealings with them a somewhat Norse-like independence. A god was to be worshipped for the good he would do one. Greater his return to his votary the greater the worshipper's respect and belief. The Roman struck a bargain with his god; for so much good done him he worshipped the god so much. If the god proved powerless the worship was withdrawn.

From this fine freedom in his religious belief, characteristic of the simplicity, the noble democracy, of the earlier days of the Roman people, there grew, coincident with the luxurious decadence of the empire, grave abuses which finally corrupted the entire tissue of the religion. There had been no priests at first. Only the fewest and simplest of attendants were devoted to the service of the gods. But gradually there were continual additions to these, until during the last days of the empire all that remained of the former religion was the groveling superstitious mysticism, zealously kept alive by avaricious priests, who levied for existence on the popular prejudices, debased morals, and superstitious fears. It was against such a state as this that the Apostle Paul took up his labors and against which Christianity finally prevailed, the last official recognition of the old beliefs going down under the proclamation of Constantine the Great, whereby the Christian religion was declared to be that of the state (312 A.D.).

Roman Steelyard. See BALANCE.

Roman Walls, four great walls built by the Romans in Great Britain. The first of these stretched from the Frith of Forth to the Frith of Clyde. It was built by Agricola in 80 A.D. In 83 he strengthened it by another wall, and in 139 Lollius Urbicus again built over the same ground, the wall being known as the wall of Antonius. These walls were built to keep back the northern barbarians, who in the form of Picts and Scots continuously menaced Roman rule in Britain. Hadrian, concluding that the walls of Agricola were insufficient for this purpose, built in the early part of the 2d century the famous wall that stretched between Newcastle on the Tyne and Solway. This wall, finished in 120 A.D., was 68 miles in length, and marked the northernmost limits of Roman territory in Britain after that date. It is known as the wall of Severus, since that ruler strengthened it in 209 by building a parallel wall a few yards above it. Consult Bruce, 'Roman Walls' (1855).

Romance', a fictitious narrative in prose or verse, the interest of which turns upon incidents either marvellous or uncommon. The name is derived from the class of languages in which such narratives in modern times were first widely known and circulated: these were the French, Italian, and Spanish, called the Romance Languages (q.v.). The treatment here given must omit any extended mention of certain isolated romances in the later Greek. A well-known example of such is 'Apollonius of Tyre,' at one time widely read in the west of Europe; transmitted to England, first probably in a Latin version, it was soon translated, and was employed by Shakespeare for the plot of 'Pericles, Prince of Tyre.' Nor can the limits of the subject admit of discussion of some few Latin works sometimes classed as romances, such as the 'Golden Ass' of Apuleius, of which use was made in 'Don Quixote' and 'Gil Blas.' For such, see articles on individual titles and authors, and the general articles on the Greek and Latin literatures. For general consideration the subject may be restricted to the Middle Ages. The finest of these romances still extant are of the 12th and 13th centuries. They may be divided into two classes—the popular epics

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(*chansons de geste*) chanted by the jongleurs and other strolling minstrels; and the more elaborate and artificial poems composed by trouvères and recited before aristocratic audiences.

The materials of both classes were more ancient lays of celebrated heroes, mingled frequently, especially in the German romances, with pagan myths, together with long connecting passages composed by the minstrels themselves. Hence originated a series of epics grouped around some renowned hero, and forming a cycle of romance. To the first class belong the German heroic poems and the Carolingian chansons; to the second the Arthurian legends.

Of the collection of the ancient German lays made by Charlemagne, nothing remains except perhaps the fragment of the alliterative 'Lay of Hildebrand,' now in the Cassel Library. It is supposed to have been written in the 9th century or even earlier. All the other manuscripts of German heroic poems are of much later date; none of them are earlier than the 13th and most of them belong to the 14th or 15th centuries. Of the 'Nibelungenlied' (q.v.) there are three copies belonging to the 13th century. In this epic Dietrich plays an important part; but the poems devoted to the simple Dietrich legend are only found in late transcripts or early printed editions, probably little later than the date of their actual composition. They represent, however, older lays, and these again still older, of equal or even greater antiquity by two centuries or more than the Cassel fragment. The language changed considerably in the course of these centuries, and the poems must have been entirely recast, rhyme being substituted for alliteration; but the change in the legend itself is immaterial. It can be traced in the Latin chronicles of the 10th and 11th centuries, and also by means of the 'Vilkina Saga,' an Icelandic prose work of the 13th century. These poems, as well as others on similar subjects, range from a few hundred to several thousand lines in length. Some of them were modernized by Caspar von der Röhn, and inserted in his 'Heldenbuch.' The complete collection is that in Heinrich von der Hagen's 'Altdeutsche Heldenlieder' (1855). Another poem closely connected with the Nibelungenlied is the Latin epic of Walter of Aquitaine, attributed to Ekkehard I., abbot of Saint Gall, who died in 973, and is said to have written it as an exercise in his youth. It is obviously a translation from a German poem, and is found in several manuscripts, none of them perhaps older than the 12th century. The 'Klage' ('Lament'), said by W. Grimm and others to be a poem of the 12th century, forms a sort of conclusion to the great German epic; and another poem, 'Biterolf,' is ascribed to the same unknown author. It extends to 13,000 lines, and contains a great number of daring adventures, in the course of which Dietrich encounters and vanquishes Siegfried. 'Gudrun' is a fine epic of nearly 7,000 lines, and is of not much later date than the 'Nibelungenlied.'

We can only mention the names of the poems which make up what has been called the Lomard sub-cycle, namely, 'König Ruther,' 'Wolfdietrich' (including 'Hugdietrich'), and 'Ot-nit,' which latter furnishes the materials for the French poem 'Huon de Bordeaux.' Frederick Barbarossa was a great admirer of Charlemagne, and collected all the accredited records of that

monarch. He patronized the minnesingers as the German representatives of the troubadours. At his great Mainz tournament were assembled not only the knights of Germany and France, but the poets also. Among those present was Heinrich von Veldeke, who imitated the 'Roman d'Eneas' in his 'Eneit,' an example quickly followed by the chief leading epic poets of Germany. Heinrich completed his poem at the Wartburg, the residence of Hermann, landgrave of Thuringia; and many other translations, among others that of the 'Roman de Troie,' were executed there shortly afterward. Another guest of the landgrave's was Wolfram von Eschenbach, author of 'Parzival.'

The *chansons de geste* form an interesting body of literature. The oldest of them are of great length, consisting generally of 20,000, 30,000, or even as many as 56,000 lines, grouped in sets (*tirades*) of from 20 to 200 lines, all ending with the same assonantal rhyme. Up till the middle of the 12th century the lines were of 10 syllables, but lines of 12 syllables, ending in consonantal rhymes, were gradually substituted. The romances were sung to the sound of a kind of violin (*vielle*), played with a regular bow. Many of the minstrels (*jongleurs*) were poor, wandering on foot from village to village, singing in the ale-houses, or at the public fairs and games; some were soldiers, such as Taillefer, who struck his first blow at Hastings. Later they became mere mountebanks. A number of them wrote their own chansons, while others bought them from their original authors, and adapted them to the taste of their audience. When a jongleur had thus procured a copy he took care to conceal it from his rivals. A few of such copies, little weather-beaten volumes, are still preserved, a noted example being the Oxford manuscript of the 'Chanson de Roland.' It was to the poets of northern and central France rather than to the troubadours of Provence that these poems were due. The *chansons de geste* are divided into three cycles—that relating to Charlemagne and his peers, the Arthurian, and the classical. The more antique the Charlemagne romances are the more they are devoted to the emperor, who is represented more as a majestic king and valiant knight than as the statesman we recognize him in history to be; at times he is depicted as being easily duped, avaricious, and capricious. Among such works are 'Girard de Viane'; 'Ferabras' or 'Fierabras'; and the 'Chanson de Roland.' The centre of the entire structure is the 'Arthurian Cycle.' In the lays of the Welsh bards, supposed to be as old as the 6th and 7th centuries, although no manuscript extant is of earlier date than the 12th century, Arthur and his companions are celebrated, but temperately, the element of the miraculous being absent. It is in the 'Historia Britonum' of Abbot Nennius (apparently written in Welsh in the 8th century, and translated into Latin afterward) that the legendary additions begin to develop. Of three or four centuries later date are the so-called 'Armorican Collections' of Walter, archdeacon of Oxford, from whom Geoffrey of Monmouth professes to translate, and in which the supernatural and marvellous elements largely prevail. The 'History' of Geoffrey was versified in French (1155-8) by Wace, a son of one of the Conqueror's followers. The 'Brut,' as this met-

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rical setting is called, contains about 15,300 eight-syllable lines, and adds a few details to the story of Arthur which do not seem, however, to have been Wace's own invention. The work was translated into English, and further amplified, by Layamon, about 1204. The 'Brut' of Layamon is composed of nearly 32,250 alliterative lines, or rather half lines. One of the most prolific of the Arthurian poets is Chrétien de Troyes (born about 1140).

One of the finest of the early French Arthurian romances 'Tristan' or 'Tristram,' was adapted by Gottfried of Strasburg, who left his 'Tristan und Isolde' slightly incomplete, about 1210. Other poems belonging to the cycle are the 'Morte Arthur,' a fine alliterative work of the 14th century; a Latin 'Life' of Merlin, in 1,529 hexameters, written about 1217; 'Li Biaus Desconneus,' a narrative of the adventures of Giglain, son of Gawain, written by Renauld de Beaujeu about 1200, and imitated by Wirnt von Gravenberg in his 'Wigolais' (about 1212). From France the Arthurian romance spread also into Provence, Spain, Italy, and the Netherlands, and was again transplanted into England.

The last of the cycles are the *classical*, in which the subjects are Alexander the Great and the Trojan heroes. The materials for the Alexandrine poems were found in an old Greek romance, written in Alexandria between 100 and 300 A.D., and known as the 'Pseudo-Callisthenes,' which was long read as authentic history, and of which there is still extant two Latin abridgments belonging to the 9th and 10th centuries. The most important romance on this subject is 'Le Romans d'Alixandre,' written by Lambert li Tors and Alixandre de Bernay in the 12th century; it contains upward of 20,800 12-syllable lines. This was the chanson that established the whole sub-cycle, and first brought the Alexandrine line into vogue and gave it its name. It concludes with the testament of Alexander and the lamentations of his 12 peers. Many French poets continued the subject. Consult: Paris, 'Histoire Poétique de Charlemagne' (1865); Grimm, 'Deutsche Heldensage' (1867); Goedeke, 'Deutsche Dichtung im Mittelalter' (1871); Cox and Jones, 'Popular Romances of the Middle Ages' (1871-2); Rhys, 'Studies in the Arthurian Legend' (1891); Paris, 'La Littérature Française au Moyen Âge' (2d ed. 1890). See also FICTION.

Romance, or Romanic, Languages, those modern European languages which owe their origin to the language of ancient Rome—the ancient spoken language, not the language of classical literature. The common or vulgar speech of the ancient Latin peoples, the *lingua rustica*, differed as widely from the language of Cicero, Virgil or Livy as does the dialect of Yorkshire or of the Scottish lowlands from the literary English of to-day: it had in a measure its own vocabulary, its own pronunciation, its own grammar and prosody. This vulgar tongue was in fact the primitive Latin speech before Latin began to be used for literary purposes, and some of the widest differences between classic Latin and the modern Romanic languages are discovered existing in the extant remains of archaic Latin speech. A glance at a page of literary Latin is enough to convince any one of the frequency of such terminations

of words as *us, um, am*, etc., none of which are ever seen in Italian or Spanish: in the most ancient specimens of Latinity that exist the final *s* and *m* are very frequently dropped; and there is strong reason for the inference that in common speech, even in classical times, not only *s* and *m* but other consonants—*t, d*, and *r* were either dropped or feebly pronounced: this is what we see in the French language. Again, words in common use among the early Romans, but which were obsolete in the Augustan age, reappear in the modern Romanic languages: examples: in ancient Latin speech *bucca* signifies mouth, but in literary Latin it signifies the puffed-out cheek: in the modern Romance languages the word derived from *bucca* means mouth; *minacia*, obsolete in the Augustan age, is revived in Italian, French, English, etc. (menace); obsolete *vitellus* reappears in French *veau*, English veal; *caballus*, nag, is the original of the word for horse in French, Spanish, etc. Though obsolete as regards literary use, such words lived on in the vulgar speech and so became current in the language of the Roman colonies everywhere. But this *lingua rustica*, called also in the Middle Ages *lingua romana*, to distinguish it from literary Latin speech, underwent great modifications and changes when it became the common speech of the Gallic, Germanic or Slavic peoples among whom it was introduced by the Roman conquerors, or who adopted it after they had overturned the Western empire. Thus arose the modern Romance languages, which are chiefly seven, namely: Italian, Spanish, Portuguese (with which is usually classed the Gallego, or language of Galicia), Provençal, French, Ladino (or Romansch) and Rumanian: the dialect of the Catalans is regarded as the southern Provençal: in all of these Romanic languages except the Rumanian, the principal foreign element is Germanic or Gothic: in the Rumanian language it is Slavonic.

Romance of the Rose, a celebrated allegorical poem, one of the most important literary compositions of the Middle Ages. It consists of two parts, the first part, comprising about 4,000 verses, was written before the middle of the 13th century by Guillaume de Lorris, and the other some 50 years later by Jean de Meung: this contains nearly five times as many verses as the first part. It is a poem of love, but it is also a satire on contemporary manners and a curious repertory of miscellaneous erudition. Guillaume de Lorris, in the introductory lines of the poem professes to set forth the whole art and mystery of Love in allegory, and the Rose is "the sweet guerdon of love": but commentators were pleased to give this not very obscure intent of the poet a mystical turn, and interpreted the Rose as signifying the divine gift of Wisdom, or the soul's state of Grace, or the state of Eternal Bliss, or even the Virgin Mary. The commingling of allegorical romance with social and political satire, history, science, economic theory, and in short with such encyclopædic erudition as existed in that age, offends the modern literary taste and is exceedingly tedious reading; but it suited exactly the taste of its time, and for more than two centuries was a classic.

ROMANES — ROMANESQUE ARCHITECTURE

Romanes, rō-mān'ez, George John, English scientist: b. Kingston, Canada, 20 May 1848; d. Oxford 23 May 1894. He was graduated in 1870 from Caius College, Cambridge, in 1874-6 worked under Burdon Sanderson in the laboratory of University College, London, and carried out important researches in nervous excitability. In 1879 he was elected fellow of the Royal Society, and in 1878 published, under the pseudonym "Physicus," a work entitled 'A Candid Examination of Theism,' in which he took up a somewhat defiant atheistic position. Subsequently his views underwent considerable change; he revised the 'Candid Examination,' and toward the close of his life was engaged on 'A Candid Examination of Religion,' in which he returned to theistic beliefs. His notes for this work were published after his death, under the title 'Thoughts on Religion,' edited by Canon Gore. Romanes was an ardent supporter of Darwin and the evolutionists, and in various works sought to extend evolutionary principles to mind, both in the lower animals and in man. He wrote very extensively on modern biological theories. His chief remaining works are: 'Animal Intelligence' (1881); 'Scientific Evidences of Organic Evolution' (Nature Series, 1882); 'Mental Evolution in Animals' (1883); 'Jelly-fish, Star-fish, and Sea Urchins' (1885); 'Mental Evolution in Man' (1888); 'Darwin and after Darwin' (1892-5); 'Examination of Weismannism' (1893); 'Mind and Motion, an Essay on Monism' (1895). In 1896 appeared a volume of 'Essays,' a selection from his 'Poems,' and his 'Life and Letters.'

Romanesque Architecture. The term is applied to any style which is assumed to have grown up immediately from the attempt of mediæval people to build as the Romans of the empire built: but it is generally used for the round-arched styles of Central and Western Europe, from the 6th to the 12th century, and as excluding the Byzantine style of the Balkan Peninsula. It is also very common to exclude the earliest Christian churches of Italy (see *BASILICA*; *CHRISTIAN ARCHITECTURE*). The word Romanesque is not very ancient, and its original meaning is rather "romantic" or "fantastic": but it was applied to architecture in imitation of the French use of the term *Roman* (fem. *Romane*), which was introduced into architectural terminology about 1835, and exactly in this sense, that is, to denote the pre-Gothic, round-arched architecture of Western Europe. Previous to that time the English writers had applied the word "Norman" to all round-arched English buildings except those few which they supposed to be of pre-Norman origin, and which they called "Saxon" or "Anglo-Saxon"; and as for the architecture of the Continent, such terms as "Lombard" and "Early Italian" were used, also "French Round-Arch" style, "German Round-Arch" style, and the like, or, in imitation of the German writers, "Byzantine," even when applied to buildings in the North. The term Romanesque is said to have been proposed by William Gunn, a clergyman and antiquarian, who died in 1841. It was taken up by better known writers, such as Whewell and Benjamin Webb.

The characteristic of the Romanesque style is the almost universal employment of the round

arch, and of constantly repeated attempts to use arched construction also in roofing churches and palace halls. The history of building in France and Germany from the 9th to the close of the 12th century is a constant series of attempts to vault wider and still wider aisles and naves, and the constant failure of those vaults, which either fell in ruins or needed to be tied and braced afterward in different ways. This came largely from the inferior mortar which was used, but, in general, from the poverty of resources of the small communities, secular and religious, and of the barons and princes of the time. Very little power of employing skilled labor existed, nor was there much skilled labor to engage; and, moreover, the means of transport were extremely inadequate, so that stones, however unfit for the purpose, had to be taken from the nearest quarry, and mortar had to be made up of such materials as were readily at hand. From this inadequacy of resources comes the constant use of heavy walls and deep-set windows, which in turn add a peculiar charm to this style. The church buildings might have been more permanent but for the constant attempt of the builders to raise the clearstory walls high above the aisle roofs, in order to secure large windows in the clearstory for the lighting of the whole interior. The higher these clearstory walls were made the more dangerous was the vault which they were to carry, and this because of the comparative difficulty of buttressing that vault when it reached a considerable height. There was also the desire to terminate the church at the east end with one or more semicircular apses, and as the churches grew larger and the aisle to be carried around the apse concentric with the inner and higher semicircular compartment, the difficulty of vaulting this aisle became almost insuperable. It was out of this twofold necessity that Gothic architecture arose, the startling innovation of the vault depending upon the ribs for their security having changed all the conditions of the problem (see *GOthic ARCHITECTURE*).

Romanesque architecture lingered the longest in Western Germany because magnificent cathedrals had been built and were building along the Rhine in this style. The cathedrals of Mainz (Mentz, Mayence), of Speyer (Spire, Spires), Trier (Trèves), and Worms, and the great churches of Saint Michael at Hildesheim, and, at Cologne, of Santa Maria, in Capitolio, of the Apostles, and of Saint Martin, show a magnificent and complete system of church building founded on the round arch and on cylindrical vaulting, which had a strength sufficient to resist the Gothic innovation for a long time. In Central France there remains a whole series of churches roofed by cupolas circular in plan, rising from square compartments by means of pendentives. This type must be thought to have come from the Byzantine through Venice; there belong to it the cathedral of Angoulême, and the churches of Gensac, Roulet, Souillac and of Saint Front at Périgueux, which last, however, has undergone a ruinous restoration. Further south is the cathedral of Le Puy (Puy-en-Velay), a round-arched church of great beauty and picturesque effect: but indeed the whole centre of France contains churches of this character, either perfect or in a much altered state.

ROMANINO — ROMANS

The especial glory of the French Romanesque is in its exquisite sculpture. Such churches as the Abbey Church at Vézelay, the cathedral of Angoulême, the Church of Notre Dame La Grande, at Poitiers, and in the South, Saint Trophime at Arles, and the never finished church at Saint Gilles, display a wealth of sculpture unequaled at the time and never approached in its value as architectural decoration except by the Gothic sculpture of the next century. There is also a curious use of polychromatic effect in the external walls at this period. Especially in the centre of France a kind of mosaic of sandstone of different colors is used freely in large parts of the church; a good example being Notre Dame du Port at Clermont-Ferrand.

The Romanesque of Italy is represented by such admirable churches as San Zeno at Verona, San Miniato on the hill near Florence, the remarkable cathedral at Modena and, for the latest period, Sant' Ambrogio at Milan and San Michele at Pavia. There are also several superb Romanesque churches at Lucca, including the cathedral; and at Pistoja, north of Florence, three most interesting churches adorned with horizontal bands of black and white. This system of coloring is rather common, and is retained until the later or Italian-Gothic period. These churches are sometimes as rich in sculpture as the French buildings of the same period.

In England the style is far less elaborate and rich, but has an especial charm for those who know the long nave of Ely, the transept of Winchester and the nave of Peterboro Cathedral, or the admirable round church of the Temple in London and that of the Chapter House at Bristol.

The Low Countries are not rich in Romanesque architecture, but Belgium possesses in the Cathedral of Tournai one of the most magnificent Romanesque churches of which we have any record. The choir indeed has been rebuilt in a later style, but the crossings remain complete, with four lofty towers surrounding a central spire-like roof and a long nave with two stories of round arches.

Bibliography.—Selvatico and Chirtani, 'Le Arti del Disegno in Italia'; Venturi, 'Storia dell' Arte Italiana' (1904); De Dartein, 'Etude sur L'Architecture Lombarde' (1882); Boito, 'Architectura del Medio Evo in Italia' (1880); Cattaneo, 'L'Architectura in Italia dal Secolo VI. al Mille Cuca' (1888); Cummings, 'A History of Architecture in Italy' (1901); Ruprich-Robert, 'L'Architecture Normande'; Scott, 'Lectures on the Rise and Development of Mediæval Architecture' (1879); Von Essenwein and others, 'Handbuch der Architektur,' 2d part.

RUSSELL STURGIS.

Romanino, Girolamo, jē-rō-lā'mō rō-mā-nē'nō, Italian painter: b. Brescia about 1485; d. there 1565. He was a pupil of Feramola in Brescia and between 1509 and 1513 lived at Padua and Venice, where he studied the rich golden coloring of Giorgione, and learned the art of reproducing it in his own works. After completing (1519-20) four frescoes in the cathedral at Cremona, he returned to Brescia. All his pictures are remarkable for their skilful composition and splendid coloring, but in his

later works his tones become silvery, clear and cold and lose the warm lustre of Giorgione's sunset tints. He painted many altar-pieces, of which the most remarkable are 'Madonna and Child' and 'The Madonna with the Dead Christ' (in Berlin Museum); 'Adoration of the Infant Christ' (in the London National Gallery, a good example of this painter's manner); 'Nativity' (in the Church of San Giuseppe at Brescia); and an 'Assumption' (in the Church of Sant' Alessandro, Bergamo). He also painted some frescoes in the castle of Malpaga, near Brescia, the home of the famous Colleoni, the commander of the Venetian armies. There are some fine portraits by Romanino to be seen at Brescia.

Romanoff, rō-mā'nōf, the name of the reigning family in Russia, founded by Michael Feodorovich Romanoff: b. 1598; d. 1645. He was descended through his grandmother from the family of Ruric, the founder of the Russian empire, and came to the throne in 1613 by election of the boyars and the higher clergy. The early part of his reign was troubled by the Poles and by turbulent nobles. Western civilization gained an entrance into the country, and many foreigners, particularly Scotchmen, became naturalized. France tried to disturb the commercial monopoly of England in Russia. Michael was succeeded by his son Alexis and the male succession of the Romanoff family continued until the death of Peter II. in 1730, when the crown devolved upon Anne, Duchess of Courland, and continued in the succession of the female Romanoffs until the death of Elizabeth in 1762. The latter was succeeded by her nephew, the son of the Duke of Holstein-Gottorp, who ascended the throne as Peter III. and established the present dynasty of Romanoff-Oldenburg.

Romans, Epistle to the, one of the epistles of Saint Paul, the genuineness of which is as a whole undisputed, though the last two chapters have been suspected by some critics to be spurious. The Romans to whom it is addressed would seem to have been mostly Gentiles converted from heathenism to a judaizing form of Christianity. It is plain from the epistle itself that these judaizing Christians, whether of Jewish or Gentile blood, were already separated from the strictly Jewish community settled in Rome. The epistle was written from Corinth just before the year 58 A.D., which was the beginning of Paul's captivity. The argument of the Apostle is directed against the efforts of some teachers in the Christian community at Rome to enforce on the Gentile believers the obligations of the Mosaic law. These Judaizers maintained that to abandon the law was to proclaim license to sin: to which Paul replies that the sole and sufficient law of Christians is that they shall lead a new life in fellowship with Christ: this fellowship makes the new life possible: the law only commands, but gives not strength to obey. The argument is so full of allusions to and quotations of the Jewish law, both moral and ceremonial, that in the opinion of many critics those to whom the epistle is addressed must have been, not Gentiles, but Jews by race: hence the suspicion entertained regarding the genuineness of the last two chapters, in which it is plainly implied that the majority

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of those "Romans" were indeed Gentiles, not Hebrews.

Roman'ticism. The word "Romantic" is derived from the old Romanic or Romance languages, which were formed by a fusion of Latin as spoken by the common people of Italy with the native tongue of the northern barbarians who invaded that country. This Romance speech naturally assumed a variety of forms, but it reached its highest development in Provence, in southern France, where it became an important instrument of popular literary expression, especially during the 11th and 12th centuries. The compositions which appeared in this vernacular tongue were generally tales and ballads in which the adventures of knights in pursuit of honor, or in devotion to the Christian religion, or the enthusiastic deeds of chivalry, and the spirit of loyalty and reverence for women were portrayed. Another mark of this literature is the evident fondness for events that are strange, mysterious, and supernatural. The name "romance" then, first applied to the language in which those compositions were written, came afterward to refer to the prevailing characteristics which they displayed, as contrasted with the works written in Latin, which were termed "classical." During the 18th century, which delighted to term itself the "Augustan Age," and prided itself upon its purity and refinement of taste, the classical models and modes of expression were regarded as furnishing the only correct standards, while the literature and art of the Mediæval Period was regarded as barbarous, and the whole mode of thought and life to be characteristic of Dark Ages that were unworthy of the attention of a cultivated man. At the close of this century, however, and during the early decades of the 19th, a marked change manifested itself in the whole tone and tendency of the intellectual life of the time. This mental revolution, which is known as the Romantic Movement, affected all departments of thought, and all artistic and literary standards and modes of expression. From the first this movement showed a consciousness of its opposition to the generally received intellectual conceptions and prevailing artistic and literary standards of the time, though this contrast was less violently emphasized in England than in Germany and France. Goethe noted and commented upon the difference between the old tendency and the new, describing it as equivalent to that between the "diseased" and the "healthy"; while Schiller contrasted them as the "naïve" and the "sentimental." It was Friedrich Schlegel who first employed the terms "classic" and "romantic" to characterize this opposition. Since that time many writers have undertaken to define and explain the fundamental distinctions between these tendencies, especially as they express themselves in art and literature. The following points appear to be most significant: (1) The main marks of classicism are simplicity, directness, and nobility and perfection in achievement. In a classic work of art, there are no evidences of a lack of harmony between the ideas and the medium, no suggestion of something remaining that cannot be expressed. As a consequence, the personality of the artist is not expressed, the artist is lost in his work, which stands impersonal and objective. He does not show his own attitude toward the subject-matter, his emo-

tional struggles and the play of his life. The Romanticist, on the other hand, puts himself into his work; it is no disembodied idea of beauty that he seeks to express, but his own personality, the longings, hopes, and ideals of a spirit that has a tendency toward the infinite, and which therefore can never express itself in any finite and objective medium. Classicism is thus always definite, objective, and complete, while Romanticism is always touched with subjectivity, and thus with a suggestion of incompleteness, which is due to the fact that it seeks to convey the mystery of spirit for which no objective mode of expression is adequate, and which therefore can only be symbolized and vaguely suggested. (2) As Romanticism endeavors to express what is strange and mysterious in the life of spirit, it naturally seeks its material in the past, and feels itself especially in sympathy with the Middle Ages, when the aspirations of the spirit, its love of adventure, and sense of the mysterious expressed themselves in quests for the Holy Grail, in crusades, and gallant deeds of chivalry and knight-errantry. Thus a sympathy with the past, a new interest in humanity as such, marks Romanticism. (3) Just because classicism sought to express the idea of beauty in definite and objective form, it was possible to lay down fixed canons of procedure and so to render the result formal, precise, and almost mechanical. Romanticism, however, aims to represent what is inner and subjective, and therefore necessarily protests against making art stilted and formal by the application of external rules and mechanical standards. Art, the Romanticists declare, must spring from the untrammelled expression of the free spirit of the man of genius. "The will or caprice of the poet," as Schlegel says, "admits no law above itself."

The Romantic Movement.—The romantic movement may best be understood if we regard it as a part of the general intellectual revolution of the 19th century, and as one in spirit with the historical and scientific spirit of modern times. The entire spiritual attitude of modern life, as contrasted with that of the 18th century, may be characterized as a new consciousness of infinite possibilities and boundless aspirations. The spirit knows itself as infinite, and is also conscious of the infinite task set for the individual through its own demand for expression and realization. The new tendency turns away in disdain from the mechanical conceptions and formal syllogisms in which the 18th century had self-complacently summed up the universe, it laughs to scorn the unintelligent and formal imitation of classical models that bases itself on ancient canons; it denounces the ethical principle of prudence; it declares that the infinitely mysterious law of life cannot be comprehended by the principle of self-love; it refuses to believe in a transcendent God. The new movement is thus romantic through and through, filled with a sense of mystery and wonder, with the love of adventure and discovery, and with the buoyant spirit of aspiration. As Wordsworth says: "In that dawning age 'twas bliss to be alive, but to be young was very heaven." This tendency to advance to new achievements manifested itself in many and various directions. In philosophy, it led to a new and fruitful attempt to comprehend in more adequate terms

God, nature, and the place and significance of man's life in the universe. The result of this is seen in the systems of Kant and the German idealists. On another side, the new interest in man and the affairs of man's life has given rise to the modern historical movement which has made its influence felt in every department of intellectual life. It is this historical interest, united with the Romantic spirit of adventure and discovery, that is the assertion of the confidence of Reason in itself, that has called into being the evolutionary sciences of nature. The concept of evolution has transformed the older view of nature, just as it did our view of man when it was earlier applied to illumine his social, ethical, and religious life. For evolution is just an attempt to explain the world by showing the relations between things as parts of a single process. It therefore always emphasizes organic relationships, and views things as parts or stages in a dynamic process, instead of taking each thing as something static, which exists in isolation as something in itself independent, and having only external relations to other things. The Romantic movement in art and literature must also be regarded as an expression in different fields of essentially the same intellectual and spiritual attitude that is shown in these other spheres of activity.

Romanticism in England.—In England a new spirit was perceptible in literature soon after the middle of the 18th century. This new movement, however, was not so intense or so fundamental in scope as its counterpart in Germany, which began a little later. For the introduction of a natural literature into England, expressing a sympathy with nature and an interest in the past, while disregarding the rigid canons of the Augustan Age, was in a way but the restoration of the healthy natural traditions that had expressed themselves in Chaucer and Spenser, in Shakespeare and Milton, and in the folk-songs and ballads, which were collected and edited by Thomas Percy in his 'Reliques of Ancient English Poetry,' in 1765. It was thus not marked by the keen sense of opposition to the prevailing system that characterized the tendency in Germany, and at a later time, also in France. Moreover, perhaps for this very reason, it did not penetrate so deep into the spiritual life of the people, or show its effects in all departments of intellectual life, as in Germany. It appears mainly as a literary movement, with which is connected some new tendencies in painting, and also as a revival of interest in Gothic architecture, which Horace Walpole did much to promote. But the movement did not involve a fundamental transformation of philosophical and scientific conceptions. This transformation came about at a later period during the 19th century, and was largely the result of the influence of German thought as represented by Coleridge and Carlyle, aided by Darwin's discovery and applications of the doctrine of evolution. The names of Gray, Cowper, and Burns, are usually placed among the English Romanticists, as well as those of Wordsworth, Coleridge, Southey, Byron, Shelley, and Keats. A little later we have the revival of interest in Dante, which culminates in the Pre-Raphaelite movement.

The Romantic School in Germany.—Lessing stands as the first to challenge the canons of the classic art and literature. Herder is at

once the pioneer of the modern historical method, and one of the first to appreciate the value of what is natural and spontaneous in literature. Influenced no doubt by the publication of Percy's 'Reliques,' he made a collection of the folk-songs of Germany. In Goethe's 'Werther' and Rousseau's 'Confessions' we have two books of nearly the same date that show many of the marks of extreme Romanticism. The name of "Romantic school," however, is usually applied to a group of men whose main centre of activity was first at Weimar and Jena and afterward to some extent at Berlin and whose work extends from about 1775 or '80 to 1806. The main names of this school are the brothers Friedrich and A. W. Schlegel, the philosopher Schelling, Novalis (whose real name was Friedrich von Hardenberg), Ludwig Tieck, and the theologian Schleiermacher. The main result of this movement was philosophical and æsthetic, though it led to some important results in the way of historical investigations. Another group of men—Uhland, the brothers Grimm, von Arnim, J. Görres and Brentano, who represent a more distinctly literary movement with strong national characteristics—are often called the younger Romanticists, whose centre of activity was at Heidelberg, where their organ, the 'Zeitung für Einsiedler,' was published.

Romanticism in France.—We have seen that Rousseau may in a sense be called one of the earliest Romanticists. As a result of the Revolution and the prolonged Napoleonic wars, literature received little attention in France during the years that were most fruitful in Germany and England. Chateaubriand and Mme. de Staël are sometimes said to be the forerunners of Romanticism in France. But the tradition of classicism was strongly entrenched, and even Victor Hugo at first adhered to this standard. But in 1826 in the 'Odes and Ballads,' and in the following year in the preface to the play entitled 'Cromwell,' he declared his allegiance to Romanticism, and at once became the leader in a new cause into which he threw himself with all the fervor of his enthusiastic nature. Besides Hugo, the principal French Romanticists are Alf. de Musset, Ch. Nodier, George Sand, Th. Gautier, and Balzac.

Bibliography.—Royce, 'The Spirit of Modern Philosophy' (1892), Lecture 6; George Brandes, 'The Romantic School in Germany' (1902); 'Die romantische Schule in Frankreich' (1897); Th. Gautier, 'Histoire du romantisme' (1872); Hegel, 'Aesthetik,' see Sections on Classical Art and Romantic Art (English translations by W. M. Bryant, and in abridged form by B. Bosanquet, 1886); F. H. Hedge, 'Classic and Romantic' (in volume entitled 'Martin Luther and Other Essays,' 1888); H. Heine, 'Die romantische Schule' (1833; English translation 1882); H. H. Boyesen, 'Essays on German Literature' (1892); H. A. Beers, 'A History of English Romanticism in the 18th Century' (1899); 'A History of English Romanticism in the 19th Century' (1901).

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Romanus I., rō-mā'nūs, **Lecapenus,** Byzantine emperor: d. Island of Protea 948. He served in the imperial navy, and was in command of the Byzantine fleet on the Danube in 917, when hearing of the defeat of the army at Achelous,

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he at once set sail for Constantinople. His designs on the throne were furthered by his popularity with his sailors and the people, and after the marriage of his daughter, Helena, to Constantine VII., he rose steadily in power, and in 919 was crowned colleague with his son-in-law. He exercised so much influence over the latter as to make him the real ruler until 944, when Constantine, aided by the sons of Romanus, caused him to be carried off to the island of Protea, where he was forced to become a monk, while Constantine was proclaimed sole emperor.

Romblón, rōm-blōn', Philippines. (1) A province consisting of a group of islands in the Visayan Sea, lying east of Mindoro and south of Luzon; they are near the centre of the archipelago, and the most northern islands of the Visayan group; area, 515 square miles. The northern islands of the group form with the islands of Mindoro and Marindique clear, deep channels, much frequented by Philippine boats; the islands are also indented with well-sheltered inlets and bays. The majority of the inhabitants of the province are Visayans; some Negritos are found on the island of Tablas, and Manguanes in Tablas and Romblón. Civil government was established in 1901. Pop. 55,339. The islands constituting the province are as follows: (a) Bantón, the most northerly island of the group; the surface is rugged except in the south-east; the soil is sterile, and few crops are raised; the chief industry is the mining of gypsum, an excellent quality of which is found; area, 11 square miles; (b) Carabao, the most southern island of the province; its chief physical characteristic is a central cone-shaped summit, from which the land slopes regularly to the sea; it is heavily wooded, but not inhabited; area, 19 square miles; (c) Dos Hermanas, two islets of rock, separated by a channel two miles in width; area, one square mile; (d) Maestre de Campo, the most western island of the province; it is circular in shape, and mountainous with steep shores; it contains one small village on the east shore; area, three square miles; (e) Romblón, the third island in size, giving its name to the group on account of central location and mineral wealth; (f) Sibuyán, the second largest and most eastern island of the group (see SIBUYÁN), and (g) Tablas, the largest island (see TABLAS).

(2) An island of the province of Romblón, lying midway between Sibuyán and Tablas, on the route of steamers passing through San Bernardino Strait and Verde Passage; area 50 square miles. A central mountain range traverses the island from north to south, with spurs extending toward east and west. The chief occupation of the people is cattle raising; valuable deposits of quartz, marble, and slate are found and quarried; the marble is exported in large quantities. This island is the seat of government for the province.

(3) Pueblo, capital of the province of Romblón, situated on the northwestern coast of the island of Romblón, the largest town of the province. It has an excellent harbor, one of the best of the Visayan group; and is the commercial centre of the island. It has some old fortifications originally built to defend it from pirates. Pop. 6,764.

Rome, Ga., city and county-seat of Floyd County, picturesquely situated at the junction of

the Oostanula and Etowah rivers, which at this point form the Coosa River. It is situated 72 miles northwest of Atlanta, 195 miles northeast of Selma, Ala., and 73 miles southwest of Chattanooga. Rome is on the Chattanooga, Rome & Columbus branch of the Central Railroad of Georgia, the Alabama division of the Southern Railway, the Georgia division of the Southern Railway, the Rome & Decatur division of the Southern Railway and the Rome Railroad division of the N. C. & St. L. Railroad. Both the Coosa and Oostanula rivers are navigable.

Public Buildings.—Rome has many modern business blocks, handsome churches, and public buildings. Shorter University for Women is here located. It also has a United States post-office and court-house, besides opera house, fine school buildings, and national and state banks.

Industries.—There is a large and increasing trade here in cotton manufacturing and general merchandise. In the city and contiguous thereto are numerous cotton mills, planing mills, furniture factories, iron foundries, plow works, ice mill, cottonseed-oil mill, sash and door factories, and other smaller industries. The assessed property valuation of Rome is over \$6,000,000.

Government.—Rome was incorporated as a city in 1847, and is governed by a mayor and city council. It has an electric light plant and waterworks, and 12½ miles of street railway system.

Population.—The population in 1870 was 2,748; (1880) 3,877; (1890) 6,957; (1900) 7,291; (1910) 12,099. Including its suburbs, it had in 1910 at least 20,000 population.

Rome (Ga.), Engagement at, and Capture of. When Gen. Sherman was closing in on the Confederate army at Resaca he ordered Gen. Garrard to move with his cavalry division from Villanow toward Rome, to cross the Oostanula and operate on Gen. Johnston's flank. On 16 May 1864, after the fall of Resaca, Gen. J. C. Davis' infantry division was ordered down the west bank of the Oostanula to support Garrard, and Garrard was further ordered to leave his artillery at Farmer's bridge, eight miles above Rome, in charge of Davis, who was to rejoin his corps at Kingston, while Garrard made a rapid movement on Johnston's flank. Davis made a march of 15 miles on the 16th, and bivouacked a few miles from Farmer's bridge. Meanwhile Garrard had, on the 15th, driven the Confederate cavalry from Farmer's bridge, and pursued to within sight of Rome, but the force developed proving too large to engage, he returned to Farmer's bridge, on his way to Lay's Ferry, where he met Davis on the evening of the 16th. Davis determined to continue on to Rome, which, when he arrived there on the 17th, was held by two Confederate brigades. At 5 p.m. the Confederates advanced and drove in his skirmishers. Davis now brought up his entire division, deployed two brigades and held one in reserve. A severe contest ensued, which continued until dark, when the Confederates withdrew to their works and Davis threw up intrenchments. On the morning of the 18th he ordered an advance, and found the works in his front abandoned. He occupied Rome, capturing ten guns, valuable iron works and machine-shops, and a large amount of public stores.

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His loss was about 150 killed, wounded, and missing; the Confederate loss, about 100 killed and wounded.

Consult: 'Official Records,' Vol. XXXVIII; Van Horne, 'History of the Army of the Cumberland,' Vol. I.

E. A. CARMAN.

Rome, Italy, the capital of the kingdom, as formerly of the Roman republic and empire, the Papal See, and long the religious centre of Western Christendom, is one of the most ancient and interesting cities of the world. It is traversed from north to south by the Tiber. Modern Rome embraces the ground, occupied by ancient Rome, on the left bank, besides an extended portion on the right, added during the rule of the Popes. A large part of the modern city stands on the flat plain known as the Campus Martius. The ancient city was enclosed by a wall, which at first embraced only the Palatine Hill, was built by Romulus, and had three gates. The second wall, attributed to Servius Tullius, enclosed all the hills, which gave to Rome the name of the City of the Seven Hills. This wall was built of huge blocks of stone without mortar. The third wall, the Aurelian (3d century), was built by the emperor whose name it bears, and had a circuit of about 11 miles. It had towers and bastions and 14 gates. It was not until the 17th century that Rome attained its present limits by a wall built under the pontificates of Urban VIII. and Innocent X. The walls are of brick and stone, and about 55 feet high, with 12 gates and several railway passages. The improvements of the modern city are suggestive of the new thought and practical endeavor of the age, yet the charm of beauty and dignity still lingers around the ruins and monuments of the ancient city. Extensive excavations have revealed interesting antiquities; those of the Forum Romanum and the Via Sacra; the remains of the temple of Saturn and of Castor and Pollux, the temples of Vespasian, of Antoninus and Faustina, the temple of Vesta, etc. Numerous villas and palaces and countless works of art have also been discovered. The Roman Forum lies between the Capitoline and Palatine Hills, and extends from the arch of Septimius Severus to the temple of the Dioscuri. It was surrounded by magnificent palaces, temples and basilicas. The Forum was originally a place where markets and courts of justice were held. It was open on one side and on the other was divided into corridors or halls containing the Exchange. This part was subsequently occupied by basilicas and temples. In 472 the Forum began to be the place of assembly of the Comitia Tributa. In the time of the Republic, public banquets and gladiatorial combats were held in the great Forum, which also contained various monuments, chief of which was the Columna Rostrata, erected in memory of the victory over the Carthaginians. The rostra, from which public orations were delivered, formed the boundary between the Forum in its limited sense and the Comitium. The Forum was under the Republic the centre of Roman political life. The Via Sacra was the main central street, skirting the Forum on one side, and passing by the Palatine to the arches of Titus and Constantine on to the Appian Way, the streets of tombs. The principal streets and squares of modern Rome

are the Piazza del Popolo on the north side near the Porto del Popolo, containing a fine Egyptian obelisk, from which diverge three of the great thoroughfares, the Corso, leading directly for one mile to the Piazza di Venezia, near the Capitol; the Via di Ripetta, which winds its course into a maze of ancient streets, and Via del Babuino, leading to the Piazza di Spagna, then further to the Quirinal, and passing through a tunnel, opens on the Esquiline; the aristocratic quarter lies between the Corso (lined with elegant modern palaces) and the Esquiline. Above the Piazza di Spagna, and approached by a noble flight of steps, is the Piazza de Trinità in front of the church of the same name, built by Charles VIII. in 1494. This eminence is the Pincio, the "hill of gardens," one of the historical seven hills, now a favorite promenade and once the site of the celebrated Gardens of Lucullus. The view thence of Rome is fine. The shaded walks are adorned by busts of celebrities. At the foot of the wall lies the Villa Borghese, containing objects of great interest, with its beautiful park, adjoining which is the Villa Medici, whose museum contains some rare antiquities. Other squares are: Piazza Barberini adjacent to the Palace; Piazza Colonna in the centre of the city, with a column of Marcus Aurelius, and nearby the Piazza di Monti Citoria, on which stands the Chamber of Deputies and other government offices; the Piazza San Pietro with its artistic colonnade, in front of Saint Peter's, and the Vatican; Piazza di Navona with a fountain and two churches. From Via Ripetta, two minor streets radiate, one to the Via Nazionale, the great business thoroughfare of the modern city and bordered by imposing and elegant buildings. From the Piazza del Indipendenza the Corso Vittorio Emanuele extends to the Piazza delle Terme and the ruins of Diocletian. All the railway lines converge at the Piazza dei Termini. The Via Cavour runs parallel to the Via Nazionale from the Station to the Capitol. The Piazza del Campidoglio in front of the Capitol contains the perfect equestrian statue of Marcus Aurelius, so celebrated as having Michelangelo's special regard. Other squares are the Piazza di S. Agnes, a martyred saint; Piazza di Navonna, containing the famous statue, a noble Greek work, of Pasquino (hence the term "Pasquinades") where for a long time satires of the day, directed against the Pope or nobility and prevalent follies, were posted; the Piazza di Montanari, where from time immemorial peasants contracted with land-owners for the season's farm-work. The Via Venti Settembre contains the immense palace of the Treasury, the war office, the Scotch church and school, many fine new edifices, and the British embassy, with its grand, old garden, the last remnant of the gardens of Papal Rome. In the new quarter, embracing the Esquiline, Viminale and a portion of the Pincian Hill, besides the Indipendenza, are the Piazzas di Dante, Vittorio Emanuele, Esquilino, Guglielmo Pepe, etc. Of the historical hills, the Capitoline, crowned with historical sites and fragments, claims our first attention. Upon it stands the modern Capitol, over the ancient Tabularium, which contained the tables of the laws, and is believed to have communicated with the Ærarium in the temple of Saturn. "The beautiful Tarpeia," says Nie-



PIAZZA NAVONA, OR CIRCUS AGONALIS, ROME.



PIAZZA DEL POPOLO, ROME. ST. PETER'S IN THE DISTANCE.

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buhr, "still sits sparkling with gold and jewels, enchanted and motionless, in a cave in the centre of the hill." Thus the ancient Mons Tarpeia remains the treasure of art, the wonder of history. On the Capitoline, Numa founded a temple of Fides Publica and another to the god Terminus. Under Tarquinius Superbus, 535 B.C., was built the Temple of Jupiter Capitolinus, with money taken from the Volscians in war. This sumptuous fane had peculiar claims on the veneration of the Roman citizens—it was citadel and shrine, combined. The Sybilline books were preserved there. There both Titus and Vespasian celebrated their triumph over the fall of Jerusalem. It was later robbed of its treasures during invasions of the Vandals. Near it stood the temple of Fides and the twin temples of Mars and Venus Erycina. The temple of Jupiter Tonans was built by Augustus; the temple of Honor and Virtue by Marius in 103 B.C., with spoils taken in the Cimbric wars. There were still other notable temples, and the Altar of Jupiter Pistor, commemorating the stratagem of the Romans, who threw down loaves into the camp of the besieging Gauls to deceive them as to the state of their supplies. On this hill Petrarch received his laurel crown, and the tribune Rienzi promulgated new laws. Michelangelo designed the present Museum and Palace of the Conservatories, under Pope Paul III. (1544-50); Pius IV., Gregory XIII. and Sixtus V. added the sculptures, etc. At the foot of the Capitol is the ancient church of Ara-Cœli, the building at the back of the piazza is the Palace of the Senator, built by Boniface IX. (1389), but altered by Michelangelo. The ornamental fountain at the foot of the double staircase was erected by Sixtus V. The tower of the Capitol contains the great bell of Viterbo, taken in war; the view from this high point is superb. On the east side of the piazza is the Museo Capitolino, containing one of the finest collections of statuary and painting, and the famous mosaic, Pliny's Doves, found in the ruins of Hadrian's Villa near Tivoli. In "The Reserved Cabinet" stands the exquisite Greek statue Venus of the Capitol, found immured in a wall upon the Quirinal. In the Hall of the Emperors is the imposing seated statue of Agrippina (grand-daughter of Augustus); and 83 busts of Roman emperors, empresses and their families, a character study. Many of them are important as works of art. The Hall of Illustrious Men is interesting, as is also the Hall of the Faun, from the Faun found at Hadrian's Villa. The statue of the Faun is highly graceful and artistic. The three gems of the collection are found in the Hall of the Dying Gladiator, the Dying Gladiator, the Antinous of the Capitol, and the Faun of Praxiteles. On the west side of the piazza is the Palace of the Conservatories, which is to receive all the recently discovered antiquities. It contains busts of artists by Canova, the restoration of a column of Michelangelo, many fine frescoes and reliefs by Bernini and other masters; the Apollo Belvedere and the famous Bronze Wolf of the Capitol, of unknown antiquity. Near the wolf is the well-known and beautiful figure of the boy extracting a thorn from his foot. The Picture Gallery of the Capitol contains few good works: a beautiful Saint Sebastian by Guido, and several others by Guercino.

At the head of the Capitol steps, to the right of the terrace, stands the Palazzo Caffarelli, the residence of the German minister; the view commands the Forum and ruins as far as the Colosseum and to the Alban Hills beyond, where every stone has its story, from the Arch of Septimius Severus to the colossal Amphitheatre, embracing the remains of temples, arches, and royal palaces. The eight Ionic columns standing are a part of the temple of Saturn. At the right side of the Forum the remains of the Basilica of Julia, begun by Julius and completed by Augustus Cæsar, and just beyond are the three beautiful columns which belonged to a temple of Castor and Pollux, 484 B.C. Here costly sacrifices were offered and Roman knights richly decorated and crowned with olive, passed in military procession. The entablature supported by these columns is very rich and considered one of the finest specimens of Corinthian extant. On the right the Via Fienili branches off, leading to the Circus Maximus, with a capacity for 25,000 people (used for hunting wild beasts). The Palatine Hill, quite near, was the pivot of Rome's history, where the Pelasgic fortress was enclosed by Romulus, and where Augustus was born. This was the site of the Palaces of the Cæsars, pompous and magnificent beyond description. The temple of Apollo, of white marble, was the resort of poets. Close under the Palatine is the temple of Vesta, founded by Numa. Near was the Regia, whence Cæsar went forth to death. Adjoining the Basilica Julia is the Column of Phocas, sung by Byron. On one side of the Forum stood the Tabernæ Argentariæ, silversmiths' shops, and in front of Saint Adriano, beyond the Taverna Nuovæ, Virginia was stabbed by her father. The front of Saint Adriano is a fragment of the Basilica of Æmilius Paulus. This Basilica occupied the site of the famous Curia of Tullus Hostilius. The three gigantic arches still farther are all that remains of the Basilica of Constantine, one of whose classical Corinthian pillars was incorporated by Paul V. in Saint Maria Maggiore. Mediæval remains exist in a group of interesting churches in the vicinity. Little remains of the once superb temple of Venus and Rome, except a cella, countless fragments of columns, and a mass of Corinthian cornice facing the Colosseum. This was the last pagan temple which remained in use in Rome. Near the church of Saint Francesca the Via Sacra passes under the Arch of Titus, the most beautiful monument of its kind remaining in Rome, erected by the senate to commemorate the taking of Jerusalem. The gardens of Adonis, where Sebastian endured martyrdom, border an adjacent lane.

Between the Arch of Titus and the Colosseum the ancient pavement of huge blocks of lava remains. At the foot of the hill is the fountain where the gladiators used to wash. On the right the Via Triumphalis leads to Via Appia, first passing under the Arch of Constantine. This is the most striking of the Roman arches. The Colosseum or Flavian Amphitheatre was begun in 72 A.D. (12,000 captive Jews doing the work), and consists of four stories supported respectively by Doric, Ionic and Corinthian columns. Its circumference is 1,641 feet, length 287, width 182, height 157 feet, and it had the capacity to hold 100,000 persons. Its construction has been ascribed to Gaudentius, a Chris-

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tian martyr; it was used for gladiatorial combats, and those engaging were slaves or prisoners, or Christians who were compelled to fight wild beasts. Saint Ignatius was the first martyr here, devoured by a lion. Others were shot down by arrows, or exposed to every humiliation and torture. A cross marks the spot in the arena where Christians suffered. The upper arches frame a series of views of the Capitoline, the Caelian, and the Campagna. Other triumphal arches not already mentioned are that of Severus and that of Drusus, 8 B.C. The Column of Trajan, very ornate in spiral bas-reliefs, illustrating the exploits of the emperor, by several thousand carved figures, and 117 feet high, is still standing. The Pantheon, by Agrippa, 27 B.C., a perfect specimen of classical architecture, is a temple to all the gods (now church of Saint Maria Rotonda) and the best preserved of all the ancient temples. It is circular in form and of remarkable construction, as regards its dome, by which it is lighted. The Catacombs are subterranean passages, extending many miles by winding passages underground, used as sepulchres and meeting places by the early Christians; niches in the walls of tufa were used to bury their dead. The passages are narrow, except occasionally when they open into wider spaces used for chapels of worship, and often frescoed. The decoration is characteristic and significant, usually representing Christian hope and doctrine. Pictures are frequently symbolic. A large collection of sarcophagi, pictures and inscriptions from the catacombs, are preserved in the Lateran Museum. The catacombs extend around the city in a wide circle; the most important are the Catacombs of Calixtus on the Via Appia; those of Domitilla or Saints Nereus and Achilleus; Saint Prætextatus, Via Appia; Saint Priscilla, beyond the Porta Salara; Saint Agnese, Via Nomentana; Saint Sebastiano, beneath the church of that name; Saint Alessandro; and the Jewish Catacombs and those of Mithras of the Via Appia.

Rome is par excellence the Mecca of artists, and both museums and Christian temples are the shrines of art. Rome is filled with churches, of which Saint Peter's ranks first. It was founded by Constantine on the site of the Circus of Nero, where Saint Peter suffered martyrdom, and is gorgeously decorated with gold mosaics and marble. Bramante, Raphael, and Michelangelo were the chief architects. Bernini filled it with the sculptures of his contemporaries and many monuments line the pillars and fill niches. The Pietà is one of the notable sculptures of Saint Peter's. The great dome is a marvel of architectural skill. The façade is 357 feet long and 144 feet high, and over the central entrance is the loggia, where the Pope is crowned and whence he gives his Easter benediction. Over the main entrance of the vestibule is the celebrated Mosaic of the Novicella (1298), by Giotto, and Cavallini. The magnificent central door of bronze is a remnant of the old Basilica (1431-9). The enormous size of statues and ornaments in Saint Peter's are deceptive as relates to the vast proportions of its interior, which is only realized by observing the moving, living figures of people. Around the shrine under the dome, 86 gold lamps burn continually. Wonderful mosaic pictures are

among the countless gems which enrich this noble temple. Its interior has the form of a Latin cross with chapels on the sides. Many princes of the church lie buried in the crypt. The Vatican, the present residence of the popes, is a vast collection of palaces, comprising the old and new palaces of the popes, the Sistine Chapel, the Loggie and Stanze, the picture gallery, museums and library. Raphael's wall frescoes rank above all his other work, and in the 'School of Athens' and 'Disputa,' the 'Transfiguration,' 'Driving Heliodorus from the Temple,' and other frescoes of the Stanze and Loggie, he evinces astonishing theological wisdom and philosophical erudition. Each stanza attests to his deep reflection and rich imagination; detail and general effect are equally studied, resulting in a perfect harmonious whole. In the Sistine Chapel, the 'Last Judgment' is Michelangelo's chef d'œuvre.

The Vatican Library contains 220,000 volumes and over 26,000 MSS. San Giovanni in Laterano, on a lonely site near the south wall, was built by Constantine, but has since been rebuilt, altered and extended by Giotto and others under various popes, and the high church councils are held there. Other churches are Santa Maria Maggiore, in whose construction antique bronzes, gold and marble from pagan temples were largely used, also beautiful mosaics of the 6th century. Santa Croce, erected by Saint Helena, the nave of which was borne by eight antique columns; Saint Clemente, the most perfect specimen of old basilica, contains frescoes by Masaccio; Il Gesù, the principal church of the Jesuits, with the façade and cupola by Giacomo della Porta, and whose interior is rich in marbles; Santa Maria degli Angeli, originally a part of Diocletian's Baths, transformed into a church by Michelangelo, an imposing church, contains an altar-piece by Muziano, and a fine fresco by Domenichino, and the tomb of Salvatore Rosa; Santa Maria in Ara Cœli, remarkable for its architecture and very old; Santa Maria in Cosmedin at the north base of the Aventine, remarkable for its Alexandrine pavement and its lofty and beautiful campanile of the 8th century; Santa Maria sopra Minerva, notable as the only Gothic church in Rome; Santa Maria in Dominica or della Navicella on the Cœlian, with 18 fine columns of granite and two of porphyry, and whose frieze of the nave was painted in Camiean by Giulio Romano and Perino del Vago; Santa Maria della Pace, interesting for its paintings, particularly the four sybils, considered among the most perfect works of Raphael; Santa Maria del Popolo, notable for its sculptures and paintings ('Jonah' by Raphael, ceiling frescoes by Pinturicchio, and mosaics from Raphael's cartoons by Aloisio della Pace); Santa Maria in Trastevere, an antique church, first mentioned in 449; and San Paolo fuori le Mura (on the spot where Saint Paul suffered martyrdom). In San Pietro in Vincoli is the celebrated 'Moses' of Michelangelo, by some critics regarded his best work of sculpture. The great baths or thermæ were peculiar features of the city and were used not only for bathing purposes, but for games and athletic sports, and contained assembly rooms, libraries, promenades, etc. The thermæ of Caracalla, Titus, and Diocletian were the most magnificent and largest. The great cloacæ (or



1. Facade of St. Peter's.

2. Interior of Basilica of St. Peter's.

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sewers) belonged to the Severan epoch. The Cloaca Maxima was the principal sewer. The aqueducts, built on rows of arches, thread the campagna for a distance of 60 miles, passing at times through hills and represent marvellous engineering skill. The Aqua Paola, Aqua Trajana and Aqua Marzia still remain, and contribute to the water supply of the city. Among the finest sepulchral monuments, the chief were the Mausoleum of Augustus in Campus Martius; that of Hadrian on the west bank of the Tiber, now the fortress of modern Rome, and known as the Castle of San' Angelo. The city was also rich in private palaces and buildings. The Naumachiae were artificial lakes constructed for fighting naval battles. There are ten bridges across the Tiber, besides the railway bridge. The highest is the Ponte Margherita, opposite the Piazza del Popolo; the Ponte di Ripetta, in the place where the old ferry was, to "the farm of Cincinnatus." (This bridge leads to the new quarter.) The Ponte Umberto, leading to the newly erected Palace of Justice or law-courts on the right bank; the Ponte Sant' Angelo, ancient Pons Ælius, leading to the castle. Below it is a new trestle-bridge; and still below this is the iron suspension bridge; farther, the Ponte Gianicolo, Ponte San Sisto; Ponte Garibaldi; then the two bridges which cross the island in the Tiber. The Villa gardens are fast being replaced by tenement houses and new suburbs are springing up. The University of Rome or Collegio della Sapienza is an ancient institution; canon law and civil law, medicine and philosophy and philology are included in its curriculum. It possesses extensive laboratories, botanical gardens and an astronomical observatory. It is attended by nearly 1,000 students. The Collegio de Propaganda Fide is situated in the Piazza di Spagna; the Collegio Romano, adjacent to Saint Ignazio, is a lyceum, and now contains the Archæological Museum and the recently established library, Biblioteca Vittorio Emanuele, combining the old Jesuit library with the libraries of suppressed monasteries, amounting to about 500,000 volumes. The Accademia de' San Luca, for the promotion of the fine arts, is composed of painters, sculptors and architects, and was founded in 1595. Connected with it are a picture gallery and schools of fine arts. There are numerous other institutions connected with art, music, science or learning, one of which the Accademia de' Lincei, founded in 1603 by Galileo and his contemporaries, is the earliest scientific society of Italy. Besides the libraries already mentioned, the chief are the Biblioteca Casanatense, the Biblioteca Angelica, and the Biblioteca Barberini. The American College was founded about half a century ago, is a school for priests and is composed of students who desire a post-graduate course in divinity, philosophy, rhetoric, metaphysics, etc. The students enjoy special privileges in the Vatican Library and museums and at all great church functions. There is also an American school of classical studies, under the auspices of the Institute of Archæology, whose work consists of archæological research and study, and whose investigations often lead the students as far as Greece or Egypt, accompanied by the faculty. The Irish College is the oldest in Rome, almost hidden by the famous Palazzo Aldobrandini, once the residence of Cardinal Mazarin. Other

famous palaces are the Palazzo Barberini on the Quirinal, built by Urban VIII., almost wholly from materials taken from ancient buildings. In its small but excellent collection is the 'Beatrice Cenci' by Guido Reni—also valuable MSS. and some literary curiosities; the Palazzo Colonna near the centre of the city; the Palazzo Corsini in the Trastevere, once the residence of Queen Christina of Sweden, and containing precious MSS.; the Palazzo Farnese, near the Tiber, was inherited by the kings of Naples, but now belongs to the French government, and is occupied by the ambassador. The Spada Palace is one of the finest examples of the late Renaissance; the Palace Rospigliosi, near the Palace of the Quirinal, contains valuable art treasures. On the ceiling of a casino in its gardens is the beautiful fresco of the 'Aurora' of Guido—this is now the residence of the French ambassador to the Pope; the Palazzo di Venezia is adjacent to the principal Jesuit church. The government buildings occupying former church property are the Post-office in the ancient convent of Saint Silvestro, the Ministry of Public Instruction in the convent of the Minerva. The porticoes or colonnades were public places of recreation or for the transaction of business. Among the basilicas, one of the most beautiful was the Æmilian on the north side of the Forum Romanum, 179 B.C.; the Basilica Julia, recently excavated on the south side of the Forum, begun by Cæsar, and the Basilica Porcia, the oldest, built by Cato, the censor. Recent excavations have thrown considerable light on the subterranean galleries, connected with the games held in the time of Cæsar in the Forum. It is clear that 12 elevators were used to deposit quickly the various parties of combatants. Equestrian statues were later placed above them. The square basement of Janus Medius, wells containing fragments of pottery, graves containing chalices, have also been discovered. Under the substructure narrow prison cells have come to light. At the foot of the Palatine were revealed the remains of an imperial palace, later transformed into a Christian sepulchre; also some prehistoric tombs. The ancient graffiti—that is the rough sketch or misspelled word scratched upon walls or columns by early Christians and thoughtless idlers, have solved many topographical problems of the ancient monuments of the "Eternal City." Among the Columns, the oldest was the Columna Mœnia, in honor of Mœnius who took the town in 338 B.C.; the Columna Rostrata, commemorating the victory over the Carthaginians 260 B.C. The most beautiful was that of Trajan in the Trajan Forum (described elsewhere), and a similar one in the Via del Corso near Palazzo Chigi. The most celebrated theatres are those of Pompey, Cornelius Balbus and Marcellus. The theatre of Pompey was adorned by the most beautiful Greek statues. It held 40,000 persons. The Colosseum as already described was the most magnificent amphitheatre. Hospitals of every description, some of which are richly endowed, are numerous. Church festivals are a special feature of Roman life, but the pomp and show of former times has somewhat diminished. External trade is unimportant. The chief manufactures are woolen and silk goods, artificial flowers, pottery, jewelry, mosaics, casts, and objects of art. Trade is chiefly in these articles,

and in olive oil, pictures, and antiquities. Pop. (1901) 462,783.

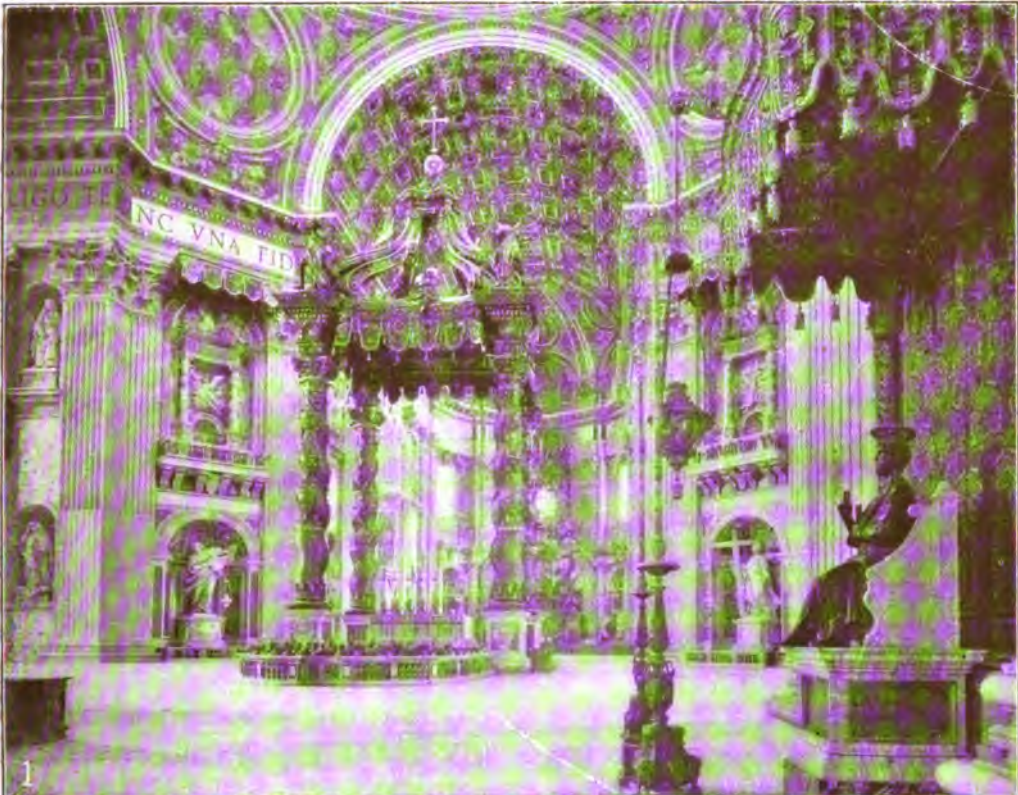
History.—Legend, accepted as authentic in later Roman times, made Romulus (q.v.) the founder of the city of Rome, and the Palatine, one of the seven hills that rise on the left bank of the Tiber, the site of the first settlement. The entire period from the date of the foundation of the city, 753 B.C., to the establishment of the republic, 509 B.C., is in its detailed history unknown to us, and from the mass of myth and legend it is possible to derive the very broadest conceptions only of the beginnings of the Roman state. This is due to the fact that the authentic records of Rome date only from 390 B.C., the year of the destruction of the city by the Gauls. Tradition, then, speaks of seven kings who, including Romulus, ruled over the city for 243 years and assigns to each definite services rendered to the state. Romulus was the founder and conqueror; his successor Numa Pompilius, was a religious teacher; Servius Tullius, a political reformer and law-giver, etc. The last three kings, Tarquinius Priscus, Servius Tullius and Lucius Tarquinius Superbus, were of Etruscan origin, whereas the earlier rulers had come from Latin stock. With the overthrow of Tarquinius Superbus in 510 the Roman kingship comes to an end. A critical study of this legendary period makes all these names and the events connected with them doubtful, but preserves the general outline of development. Rome, in the modern view, is regarded as having had its origin in the union of three tribes, the so-called Ramnes, Tities and Luceres, of whom the first were of Latin blood, the second of Sabine stock and the third of doubtful affinity. The situation of Rome on the hills near the mouth of the Tiber was favorable for its development, and in the course of time the city extended its authority over the neighboring country until with the destruction of Alba Longa, the ancient religious centre of the Latin peoples, it came to assume a pre-dominant position in Latium. The Etruscan character ascribed to the last three kings points to an Etruscan conquest, and indeed throughout the early period of Rome the influence of the Etruscans to the north is marked, especially in religious customs and in architecture. From the very earliest period the inhabitants of Rome appear to have been divided into two classes, the patricians and the plebeians or *plebs*, with whom probably may be ranked the class of *clientes*. It was the patricians alone that constituted the state; the *plebs* had no political rights whatsoever. In fact early Rome should be regarded as consisting of two isolated communities, one comprising the original settlers or, possibly, the conquerors of the city, the other the conquered population and later immigrants, such as those attracted to Rome by the excellent opportunities for trade it offered. Not only was the political power in the hands of the patricians, but even the early Roman religion was largely in the nature of a narrow national creed to which the plebs could not be admitted. Intermarriage between members of the *populus* and plebeians was forbidden. The patricians alone had the right to bear arms. Within the *populus* or state, the headship was vested in the *rex* or king, who combined in himself the functions of war leader, judge and priest, and was

assisted by a council of elders or senate. The Roman "people" was divided into wards, class or *gens*, and households. When assembled for the exercise of its sovereign powers it was known as the *comitia curiata*. A change in the relations between patricians and *plebs* was effected by a reform which legend ascribes to Servius Tullius. By this innovation the right of bearing arms was conferred on the *plebs*, and the entire free-holding Roman community was divided into five classes, on the basis of wealth. These classes were subdivided into centuries or "hundreds," and the entire military assembly of the inhabitants bore the name of *comitia centuriata*, which, instituted undoubtedly for purposes of national defense, soon came to exercise important political powers.

The expulsion of Tarquin was followed by long wars with the Etruscans and the Latin tribes, in the course of which Rome for a time had to contend for its existence. A great victory over the Latins in 496 led to the formation of a Latin Confederacy under the leadership of Rome. Thus strengthened the Romans fought successfully against the Æqui, the Volsci and the Sabines, and in 396 captured the Etruscan stronghold of Veii, which was followed by the subjugation of southern Etruria.

The place of the kings was taken after 509 by two consuls, elected by the *comitia centuriata* from the ranks of the patricians. The institution of the senate was retained and plebeians were admitted to membership, but all magisterial offices were closed to members of that order. The period that follows, therefore, is marked by a bitter struggle on the part of the plebeians for political and, to a degree, social equality. Wealth, too, became concentrated in the hands of the patricians and the distribution of the public lands was carried on entirely in the interests of the ruling class. Discontent was also fostered by the severity of the laws against debtors. In 494 the plebeian army, just returned from a victorious campaign, seceded to the Sacred Mount, near Rome, and threatened to found a city for themselves unless concessions were made. The patricians yielded and the office of tribune of the plebs was created for the defense of the interests of the lower order against the ruling class. These tribunes, originally two in number, later increased to ten, were given the right of veto on the decisions of the consuls and the senate. In the course of the struggle for an equitable division of the public land, Spurius Cassius, a patrician who espoused the cause of the *plebs*, fell a victim to the vengeance of his caste (486 B.C.). The demand for a codification of the laws led to the appointment in 451 of ten Decemvirs who after two years' work brought forth the Twelve Tables in which the entire system of public and private law was embodied. The act of violence attempted by Appius Claudius, head of the Decemvirs, on the plebeian maiden Virginia led to the overthrow of the Decemvirs in 449 B.C. Protected now against the arbitrary misuse of the law on the part of the patricians, the plebeians pursued with renewed strength the struggle for political and social equality. In 445 intermarriage between patricians and plebeians was made legally valid. The consuls were supplanted by military tribunes with consular power who might be chosen from among the plebeians. After this the plebeian

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1. Interior of Saint Peter's.

2. Interior of Saint Paul's.

conquest of offices proceeded steadily. The quaestorship was gained in 421 B.C., the dictatorship in 356 B.C., the censorship in 351, the praetorship in 337. After a ten years' struggle it was provided by the so-called Licinian Rogations (367 B.C.) that no citizen should own more than 500 *jugera* of the public domain and that the remainder should be distributed among the plebs in small allotments. The consulship was also restored and it was made obligatory for one consul to be chosen from the plebs. By the year 300 complete equality between the orders had been established. The termination of the contest between the two orders may be assigned to the year 286 B.C., when the Hortensian Law made any decree of the *Comitia Tributa*, wherein the plebs were predominant, law for the whole people, the so-called *plebiscite*.

The course of political progress during this period was sharply interrupted by the invasion of the Gauls who in 390 overwhelmed a Roman army on the Allia, burned the city and besieged the garrison in the Capitol. Legend ascribes the defeat of the Gauls to Camillus (q.v.), but in reality it was a large ransom in gold which induced the conquerors to retreat. The devoted patriotism of its citizens, however, restored the fortunes of the city; its houses were rebuilt, the attacks of the neighboring peoples, the Volsci, the Æqui and part of the Latini were repulsed, and within a short time Rome had more than regained its former power. With the establishment of internal peace, its career of rapid conquest begins. The Samnites, the most formidable rivals of the Romans, were defeated in three great wars (343-341, 326-304, 298-290) in the course of which Rome contended successfully against the united forces of the peoples of central Italy, aided in the last of the wars by the Gauls. A rebellion of the Latins was crushed in 338, the long struggle terminated in the complete subjection of the allies, and the inhabitants of Samnium, Picenum, Umbria, Apulia, Lucania and Etruria became the allies of Rome. In 280 war broke out with Tarentum, the most powerful of the Greek cities in southern Italy. Tarentum called Pyrrhus (q.v.), king of Epirus, to its aid. Subjected at first to defeat, the Romans ultimately drove Pyrrhus from Italy and took Tarentum (272). Rome was now mistress of central and southern Italy and had fought with success against the Gauls in the north. To make conquest permanent military colonies were planted in the subjugated territories and a great system of public highways was developed to facilitate communications. The incessant wars had made Rome a nation of soldiers, and now that there was no one to resist it in Italy, it turned its arms against a foreign power, and in the struggle with Carthage made the first beginning of its imperial career.

The early relations between Rome and Carthage were friendly and commercial treaties between the two nations had been concluded at various times. The contest between the two broke out in Sicily, of which the Carthaginians were masters in greater part. The first Punic War (264-241 B.C.) began with the invasion of Sicily by a Roman army. The strength of Carthage, however, was on the sea, and to cope with it, the Romans built a fleet with which in 260 they gained a great victory at Mycalæ. The fortunes of the war wavered for

a long time until a second victory off the Ægæan Islands in 241 brought Carthage to terms. Sicily was surrendered to the Romans who erected it into their first province, and Carthage pledged itself not to wage war on the allies of Rome. In 238 the Romans seized Sardinia and in the following year extended their sway over the Illyrian coastlands and upper Italy. Carthage, robbed of its island possessions in the Mediterranean, more than made up its losses in Spain, and in 218 B.C. the celebrated Hannibal (q.v.), son of Hamilcar Barca, the conqueror of the peninsula, renewed the contest with Rome (the second Punic war) by his attack on Saguntum, a city ally of Rome. Hannibal invaded Italy, overthrew the Romans at the Trebbia (218), on Lake Trasimene, in the following year, and in 216 at Cannæ, where the rout of the Romans was complete. Rome, however, remained steadfast with Hannibal at its very gates, husbanded its resources and by carrying the war into Africa forced Hannibal to depart from Italy. In 202 the Carthaginian general was defeated by P. Cornelius Scipio at Zama, and Carthage signed peace giving up Spain to the Romans, dismantling its navy and paying an indemnity of 10,000 talents. The hatred of Rome, however, was not appeased, and when Carthage, after 50 years, showed signs of renewed strength, it was attacked and destroyed (146), after a siege of three years (the third Punic war). The Roman arms in the meantime had also conquered the East. Antiochus III. of Syria was defeated in 190 at Sipylus and deprived of his possessions in Asia Minor. Macedonia, after repeated wars, was made a Roman province in 146, and Greece, which had enjoyed the shadow of freedom for 50 years was reduced to the same condition, in the same year, under the name of Achaia, after Corinth, its most prosperous city, had been stormed and robbed of its art treasures. In 133 Rome fell heir to the dominions of Attalus, king of Pergamus, and the province of Asia was formed out of the territories thus acquired. The Roman rule in the Spanish peninsula was firmly established after two formidable insurrections, one led by Viriathus (148-140) and the other known as the Numantine war (143-133), had been suppressed.

Republican Rome was now at the height of its power, but the wars which had been crowned with such success abroad brought on evils within the state which were destined to destroy it. The task of governing a world empire and carrying on the great game of diplomacy by which that empire had in large measure been built up, naturally called for a more centralized and rapid exercise of authority than was possible with the cumbrous methods of the popular *comitia*. The power of the state gradually passed into the hands of the senate. There grew up at the same time a nobility of the robe, consisting of those who had enriched themselves as rulers of the newly conquered provinces which Rome for a long time regarded as subject territories merely and as fruitful sources of revenue. So wealthy had the state become, indeed, that in the second half of the 2d century B.C. the citizens of Rome were freed from all burdens of taxation, a measure which attracted to Rome a large population of idlers, which derived its chief sustenance from the largesses of the nobles who

found it necessary to court the favor of the mob. Throughout Italy the rich Roman office holders established vast landed estates, which were fast coming to be worked by slaves, and the poor farmers, ruined by this formidable competition, came in great numbers to Rome to swell the ranks of the propertyless. Between this great mass of poor proletarians and the small class of officials, senators and landlords, strife was in the nature of things bound to come, and it was this strife between the *Optimates* or the aristocratic party and the *Populares* or proletarians that, skilfully used by ambitious politicians, brought about the fall of the republic. Nobles of the popular champions were the brothers Tiberius and Caius Gracchus (q.v.) who wrested from the senatorial party an agrarian law favorable to the homeless masses and regained some of the ancient powers of the popular assemblies, but fell victims both to the hatred of their enemies (133 and 121). The war against Jugurtha (q.v.), which revealed the shameless corruption to which the ruling party had sunk, brought forth another popular leader in Marius (q.v.), whose reputation was increased by the splendid victories over the Cimbri and the Teutones in the years 102-101. Moderate at first in his views, Marius was driven, by the agitations of demagogues, to violence. In 90 B.C. the Italians rose in insurrection to enforce their demand for the rights of Roman citizenship, and though the allies were defeated it was deemed expedient to grant them their demands. The termination of this struggle, known as the Social war, in 88 B.C., was followed by a conflict between Marius and Sulla (q.v.), an adherent of the senatorial party, for control in the state, in the course of which both factions were guilty of dreadful excesses. In the year 81 the Marian party was finally overthrown, and Sulla, proclaimed dictator, enthroned himself in power by a bloody proscription of his enemies, and proceeded to revolutionize the constitution of the state so as to place the sole power in the hands of the senate and the aristocratic party. But neither senate nor people was thenceforth to govern in Rome. The example of aristocratic rule based on military force had been set by Sulla and the struggle between parties now passed into a struggle between individuals for control. Gnaeus Pompeius (q.v.) by his victories over Sertorius in Spain and the suppression of the servile insurrection under Spartacus attained immense popularity and this was increased by his readiness to make concessions to popular demands. After his triumphant campaigns against the Mediterranean pirates and Mithridates (q.v.) he was for a time master of Rome. The senate, however, stirred to an assertion of its rights by its successful course in the conspiracy of Catiline (q.v.) now set itself to oppose his will and Pompey, desirous of redeeming the promises made his veterans of allotments of land in Italy, joined with Gaius Julius Caesar (q.v.) and Licinius Crassus (q.v.) to form the first Triumvirate which for a time was absolute in Rome (60 B.C.). Caesar was a leader of the popular party and he aimed at becoming the sole power in the state. Crassus died in 53, and in 49 war broke out between Caesar and Pompey. The former had under his command a splendid army trained by years of campaigning in Gaul and

Britain and in the battle of Pharsalia (48) Caesar was victorious. Pompey fled to Egypt and there perished and the remnants of his party were wiped out at Thapsus in 46 and Munda in the following year. Caesar was now undisputed master of the empire, but fell, after a short rule, beneath the daggers of Brutus and his associates, and his death was followed by the renewal of civil war. Gaius Octavius, Caesar's nephew and adopted son, and Marcus Antonius, Caesar's lieutenant, both aspired to be his successor, but joined in 43 with Aurelius Lepidus, in a second Triumvirate to overthrow the party of Brutus and Cassius. This was accomplished at Philippi in 42, and Octavius and Marcus Antonius, setting aside the weak Lepidus, divided between them the Roman world. But while Octavius governed his western realm with energy, Marcus Antonius gave himself up to the pleasures of Cleopatra's court. War broke out between the two and in the naval battle of Actium (31) the forces of Marcus Antonius were utterly routed. Antonius fell by his own hand and Octavius was left without a rival. With Actium begins the Roman empire.

Octavius made no change in the established forms of government. In 27 B.C. the senate conferred on him for life the government of all those provinces whose defense called for the employment of the military forces of the empire, together with the supreme command of the army and the title of Augustus. Successively Augustus united in himself the great offices of the state, the consulate, the tribunate, the headship of the sacred colleges. The senate was left with the splendid shadow of power, in reality the mere instrument of the emperor's will. The empire, and especially the provinces, found peace after a half century of civil strife and acquiesced in the rule of an autocrat whose sway was far more kindly than the selfish rule of an aristocratic oligarchy. Under Augustus the economic development of the empire made rapid progress; its parts were brought more closely together by increased means of communication; with peace came also rapid intellectual growth, and Latin literature had its golden age in the reign of Augustus. The boundaries of the empire were extended to the north by the campaigns of the emperor's stepsons Tiberius and Drusus, who carried their victorious arms to the Danube and beyond the Rhine. The last years of Augustus' reign were darkened by domestic unhappiness and the great disaster of the Teutoburg Forest where Varro's legions were annihilated by the Cheruscan chief Arminius. Augustus was succeeded in the principate by his stepson Tiberius (14-37 A.D.) who ruled ably in the beginning but hardened with time into a gloomy despot whose suspicions fell heavily on all those members of the nobility who might in any way become rivals for power. Living in retirement on the island of Capræ he left the government to powerful ministers, of whom Sejanus (q.v.) is the most celebrated. Caius Caligula (37-41) a madman and a tyrant, was murdered by his guards and was followed by Claudius (41-54) a good-natured dotard who was completely under the control of his infamous wives, Messalina and, after her, Agrippina. By the latter he was poisoned and Agrippina's son, Nero (54-68), succeeded to the throne. After giving the fairest promise for some years, the young

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1. The Muses in the Vatican Museum.
2. Famous statues in the Vatican Museum.

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emperor, in spite of such advisers as Seneca and Burrus, entered upon a course of infamous excesses and mad escapades which disgusted alike the senate and the army and brought about a revolt before which Nero fled. Unable to escape he killed himself, the last of the Julian house of emperors.

Galba, Otho and Vitellius, military rulers all proclaimed by their respective armies, fell within the space of two years and were succeeded by Flavius Vespasianus (69-79), commander of the legions in the east. Vespasian introduced economy into the government, brought to an end the Jewish war by the storming of Jerusalem (70) and began the conquest of Britain. The brief reign of his son Titus (79-81) was marked by the eruption of Vesuvius which overwhelmed the cities of Herculaneum and Pompeii (24 Aug. 79). The reign of Domitian (81-96), a younger brother of Titus, was a period of oppression and intellectual stagnation. Cruel, despotic, half-mad Domitian resembled the last rulers of the Julian house rather than the great emperors whom he succeeded and by whom he was followed. Nerva (96-98) was succeeded by M. Ulpius Trajanus (98-117), under whom the empire attained its greatest extent. His campaigns north of the Danube resulted in the erection of the province of Dacia; Armenia and Mesopotamia were acquired and the Parthians were driven back from the Euphrates. Hadrian (117-138) had none of the warlike instincts of his predecessor, but he devoted himself to the task of organizing the affairs of the empire, and better to acquaint himself with the condition of the various provinces he made long and repeated journeys embracing every part of the Roman dominions. Hadrian was succeeded by the philosopher-emperors Antonius Pius (138-161) and Marcus Aurelius Antoninus (161-180), in whom were exhibited the highest and fullest development of the Pagan character, and though the reign of the latter was disturbed by wars against the Parthians and the peoples of the Danube, it was of this age of the Antonines that an eminent historian speaks as the happiest era in the entire course of European history, if the welfare of the great mass of the population be considered.

With the death of Marcus Aurelius the decline of the empire begins. On the north the Germanic peoples were threatening the Roman frontier and on the east the new Persian kingdom arose as a formidable adversary. Commodus (180-192) neglected the affairs of the empire to win the laurels of a gladiator and was murdered by some of his followers. The Prætorian guard now appears as the maker of emperors. It deposed Pertinax who had been chosen by the senate and sold the throne at auction to the Senator Didius Julianus. The armies of the provinces arose and three claimants for the throne appeared. The successful candidate Septimius Severus (193-211), successful by force of arms, ruled well and sought to repress the power of the Prætorians. The reign of his son Caracalla (211-217), one of the most vicious tyrants in Roman imperial history, is noteworthy for the extension of the rights of Roman citizenship to all free inhabitants of the empire. Caracalla was assassinated by the Prætorian prefect Macrinus, who was speedily succeeded by Heliogabulus (218-222), a priest of

the sun at Emesa. Heliogabulus brought with him to Rome the orgiastic rites of the Orient and became the object of national hatred and contempt. He fell at the hands of the Prætorians, who chose as his successor Alexander Severus (222-235) who ruled with fair ability but perished in a mutiny of the German legions. There followed a period of confusion in which the decline of the empire was rapidly accelerated. Maximinus (235-238), a Thracian by birth and a soldier of fortune, crushed his rivals, the two Gordiani, but fell in battle against the forces of the senate. Balbinus and Maximus, chosen by the senate, were slain by the Prætorians, and Gordianus III. ruled from 238 to 244. He was followed by Philip the Arab (244-249), Decius (249-251), Gallus (251-254), Valerianus (254-260) and his colleague Gallienus (254-268). Valerian was defeated by the Persians and taken prisoner and on the ensuing anarchy usurpers arose in every province, known collectively as the Thirty Tyrants. The border lands of the empire suffered from the invasions of the Germanic peoples and the Persians, and a pestilence which raged for 15 years (251-265) carried off one half of the inhabitants of the empire. The fortunes of Rome rose somewhat under the following emperors, Claudius (268-270), Aurelianus (270-275) who drove the Goths beyond the Danube and overthrew the Palmyran kingdom of Zenobia, Tacitus (275-276), and Probus (276-282) who held the Rhine against the Germanic tribes. Carus (282-283) perished in a campaign against the Persians and was succeeded by Numerianus (283-284) who died in the following year. The army thereupon proclaimed as emperor Valerius Diocletianus, who after the death of Carinus (283-285) became sole master of the empire.

Diocletian abandoned the ancient forms of government and transformed the empire into an absolute monarchy. He separated the civil and military administrations, created a new order of officials and brought the finances into order. The supreme power he vested in the hands of two Augusti assisted by two Cæsars who in turn were to succeed to the office of Augustus. Thus a more efficient administration would be ensured by the practical division of the empire into four parts. Diocletian, however, did not count on personal ambitions which were destined to wreck his plan. In 305 Diocletian resigned his office and compelled his fellow Augustus, Maximianus, to do likewise. They were succeeded by the Cæsars, Constantius Chlorus and Galerius, while new Cæsars were created. Confusion and civil war followed and at one time there were six Augusti in the field. The struggle finally narrowed down to a contest between Licinius and Constantine, a son of Constantius, and after two wars Licinius was overthrown and Constantine became sole ruler of the empire. Constantine the Great (324-337) continued the administrative policy of Diocletian. He built Constantinople as a new capital for the empire and made Christianity the state religion. Of his three sons to whom he left power, Constantinus, Constantius and Constans, the first died in 340 and the last in 350. Constantius ruled with undisputed power from 353 to his death in 361. He was followed by Julian, known as the Apostate, (361-363), who fell against the Persians, and Jovian (363-364). Valentinian I. ruled from

364 to 375. He left the government of the east to his brother Valens and made his son Gratian co-emperor. Gratian ruled till 383 with Valentinian II. as co-emperor. The Goths had now broken into the empire and in 378 they inflicted a terrible defeat upon Valens at Adrianople. In this extreme Gratian conferred the government of the east upon Theodosius (379-395), who by war and diplomacy effected a settlement with the Goths. In 392 Valentinian II. died and Theodosius became sole ruler of the empire. His own death followed in 395, after he had divided the empire between his sons, Honorius, to whom was assigned the West under the guardianship of Stilicho, and Arcadius, who became emperor of the East with Rufinus as his adviser. The influx of Germanic tribes into Italy increased in volume. The tide of invasion was checked for a moment by the generalship of Stilicho (q.v.), but in 410 Rome was sacked by the Goths under Alaric, who, passing into southern Gaul established a kingdom there. Other Germanic hordes wrested Spain from the Roman arms. Honorius died in 423 and was succeeded after a brief interval by Valentinian III. who ruled till 455. The defeat of the Huns under Attila on the Catalaunian Fields in Gaul (451) by Aetius was the last effective assertion of the Roman power. Valentinian III. was murdered in 455 and in the strife for the throne that followed, Valentinian's widow summoned to her aid the Vandals from Africa, who plundered the city of its treasures. For 20 years there came a succession of shadow kings, made and unmade by the all powerful commanders of the German mercenaries, Ricimer, and after him Orestes, who in 475 placed his young son Romulus on the throne. The troops under Odoacer (q.v.) revolted, Orestes was overthrown, the child emperor was retired to private life and in 476 Odoacer assumed for himself the title of king of Italy, thus marking the end of the Roman empire in the West. For the history of the East Roman empire see **BYZANTINE EMPIRE**.

History of the City of Rome subsequent to 476 A.D.—After the overthrow of the Western Empire and the defeat of Odoacer (see **ITALY, History**) Rome came under the rule of the Ostrogoths. The city suffered severely in the wars between the Goths and Byzantines, in the course of which the city was taken six times. The depredations of the Byzantine emperors as well as of the Christian authorities, who made use of the materials and ornaments of the ancient edifices in the erection of their churches, were the cause of the destruction of many ornaments of the imperial city; but more destructive still were the feuds that afterward (especially in the 10th century and later) raged in Rome between the leading families. In 1084 a part of the Campus Martius, and most of the city in the south, were devastated by the army of Normans, Greeks, and Saracens which Robert Guiscard led to the relief of Gregory VII., then besieged by Henry IV. of Germany in the Castle of Sant' Angelo. In the 14th century the work of destruction and depopulation was hastened by the struggles which resulted from the attempt of Rienzi (q.v.) to found a republic, and was continued during the period of confusion that ensued after the commencement of the great schism in 1378. A terrible pestilence which raged in the city in 1348, is said to have reduced

the number of inhabitants to less than 20,000. A temporary check was given to the confusion that prevailed in Rome toward the end of the 14th century by Boniface IX., but order was not permanently re-established till Martin V. took up his residence in the city after the schism had been virtually terminated by the Council of Constance. Martin's successor, Eugenius IV. (1431-47), is usually named as the pope under whom the work of restoration in Rome began. In this he was followed by Nicholas V. (1447-55), who began the building of the Vatican, Pius II. (Æneas Sylvius, 1458-64), Paul II. (1464-71), who, however, quarried in the Colosseum for the erection of the Palazzo di Venezia, as did also Paul III. (1534-50), when building the Palazzo Farnese. But the most important period in the architectural history of modern Rome was the end of the 15th and beginning of the 16th centuries, when the labors of Bramante, the two Sangalli, Peruzzi, and Michelangelo were pursued under the patronage of Sixtus IV., Alexander VI., Julius II., and Leo X., and when the works of the great architects were adorned in the interior by artists as great or greater, such as Raphael and Michelangelo himself. In 1527 the city was sacked by an imperial army under the Constable of Bourbon. From this date onward the city began to extend more and more over all parts of the Campus Martius. Much was done in the 16th century, especially by Paul III., Pius IV., Gregory XIII., and Sixtus V., for the embellishment and enlargement of the town, the improvement of the streets, and the restoration of the fortifications. Many remains of antiquity were then rescued from destruction, although many more were sacrificed, particularly under Sixtus, for the sake of modern structures. In the 18th century Benedict XIV., Clement XIV. (founder of the Museo Pio-Clementino), and Pius VI. deserve special mention for their efforts to preserve and beautify Rome. In 1798 Rome was occupied by the French, and deprived of many of its art treasures. At the same time a republic was erected in Rome, but this only lasted for a short time, and after a series of disturbances and changes the pope was again reinstated in his dominions in 1799. (See **ITALY**.) From 1809 to 1814 Rome was once more under French rule, the States of the Church having in the former year been annexed to the Napoleonic empire. The short-lived Roman Republic of 1848-9 was followed by the restoration of the papal rule in 1850. On 20 Sept. 1870, the Italian troops, after effecting a breach in the Porta Pia, in the northeast of the city, marched in along the Via di Porta Pia (henceforth called Via Venti Settembre). Since then Rome has been in the possession of Italy, and since the 1st of July of the following year, the capital of the kingdom.

Bibliography.—Arnold, 'History of Rome' (1871); Duruy, 'History of Rome and the Roman People' (1883); Fustel de Coulanges, 'The Ancient City' (1874); Gibbon, 'History of the Decline and Fall of the Roman Empire,' best edition by Bury (1896-1900); Hodgkin, 'Italy and her Invaders' (1880-99); Hoeck, 'Römische Geschichte vom Verfall der Republik bis zur Vollendung der Monarchie unter Konstantin' (1841-50); Ihne, 'History of Rome' (1871-7); Lanciani, 'Ancient Rome in the Light

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of Recent Discoveries' (1888); Merivale, 'History of the Romans under the Empire' (1890); Mommsen, 'History of Rome' (1894-5); Montesquieu, 'Considérations sur les Causes de la Grandeur et de la Décadence des Romains' (1734); Niebuhr, 'History of Rome' (1859); Peter, 'Geschichte Roms' (1881).

Rome, N. Y., city in Oneida County; on the Mohawk River, the Erie and the Black River canals, and on the New York C. & H. R., the New York, O. & W., and the Rome, W. & O. R.R.'s. The last mentioned now (1904) belongs to the N. Y. C. & H. R. railroad. The city is about 110 miles west by north of Albany and 16 miles northwest of Utica. It is at the head of the Mohawk Valley, on a plateau about 450 feet above Sea-level. The first settlement was made in 1760 by John Roof. The central part of the city is the site of Fort Stanwix (q.v.), erected here in 1758 at a cost of over \$200,000. It was then a place of great importance as it was the defensive point in the "carrying place," or portage, that part of the route between the Atlantic and the Great Lakes, where the journey had to be made by land. Fort Stanwix was a storm centre in the French war and also in the Revolutionary War. Here in July and August, in 1777, there were many sharp engagements, and finally the Tryon County militia under Herkimer defeated the British under St. Leger in the battle at Oriskany. A government arsenal was established here in 1814, but in 1873 was sold for a factory. In 1819 Rome became a village and in 1870 was chartered as a city.

The greater part of the water supply is taken from the Mohawk River, two miles above Rome, at a place called Ridge Mills. The surrounding country is devoted to farming and dairying; but Rome is a manufacturing city. The chief industrial establishments are brass and copper mills, locomotive works, knitting mills, brick works, canneries, breweries, metal bedstead factories, and creameries. The facilities for transportation give Rome considerable commercial advantages. The prominent public buildings are the Rome State Custodial Asylum for Incurable Insane, the Oneida County Home, the municipal buildings, and some of the business blocks. There are 17 churches and two missions. The educational institutions are the Central New York Institution for Deaf Mutes, Saint Peter's Academy (R. C.), opened in 1865, 10 graded public and parish schools, five public kindergartens, four private schools, and three libraries. The libraries are the high school, the Jervis City Library, and the Y. M. C. A. Library. There are two national banks with a combined capital of \$200,000, and two savings banks. In January 1900, the city debt was \$427,564, largely due to the amounts paid for the city sewerage and for the waterworks. This amount has been considerably lessened. The assessed valuation is about \$10,000,000 yearly. The government is vested in a mayor and a council of 15 members, who hold office three years. Pop. (1900) 15,343; (1910) 20,497.

A. H. WRIGHT,
'Rome Sentinel.'

Rome, Œcumenical Councils of, are six in number, namely, five Lateran Councils, so called as having been held in the Lateran palace; and the Vatican Council, held in the palace of the Vatican. 1. The ninth General Council of the Church, the first Lateran Council, was held in

the reign of Calixtus II. in 1123; it confirmed the concordat of Worms regarding Investiture (q.v.). 2. The second Lateran (10th general) Council, held in 1139 under Innocent II., condemned the Manichæan errors of Arnold of Brescia (q.v.). 3. The third Lateran (11th general) Council, under Alexander III. in 1179, condemned the heresies and impieties of the Waldenses and Albigenses. 4. The 12th general Council (4th Lateran) held in 1215 in the pontificate of Innocent III., confirmed the doctrine of transubstantiation and promulgated decrees for the reformation of abuses in the Church and the extirpation of heresies. 5. The 19th General Council (5th Lateran) under Julius II., assembled in 1511, was in session till 1517 when Leo X. was pope; it enacted some laws for the reformation of clerical discipline, and procured from the king of France, Francis I., the revocation of the Pragmatic Sanction (q.v.) which the French clergy had ever regarded as the bulwark of the Gallican Liberties. 6. The Council of the Vatican (20th Œcumenical council), which was opened 8 Dec. 1869 and closed 20 Oct. 1870, under Pius IX., affirmed as the teaching of the Catholic Church the doctrine that the Pope when teaching *ex cathedra* and defining matters of faith or morals is always divinely aided and is infallible.

Rome State Custodial Asylum, an institution for the custody, maintenance and treatment of the custodial class of feeble-minded, located at Rome, N. Y. It was formerly the Oneida County Insane Asylum and Almshouse, but by the acts of the Legislature in 1893 and 1894, the building and grounds were purchased by the state. Among other things, calisthenics, dancing, drilling, kindergarten, sloyd and articulation are taught. Agricultural colonies for the brighter male inmates have also been established.

Feeble-minded are committed to this asylum from all counties in the State, according to the quota assigned each county, which is based on the population of the respective counties, as compared with the capacity of the institution. For their care there are 21 large buildings, beside several small sheds, etc. The average number of inmates is about 700.

Romeo and Juliet, a tragedy by Shakespeare, first published (unauthorized) in 1597. A corrected edition appeared in 1599. The play was written somewhere between 1591 and 1596, and the legend upon which it is founded first appears in a tale printed at Naples in 1476 among the 'Novelle' of Masuccio di Salerno. Luigi da Porta reproduces it in 'La Giulietta' in 1435, and Bandello includes it in his 'Novelle' in 1554. In 1559 a French version of Bandello's 'Novelle' was printed among Pierre Boiastuau's 'Histoires Tragiques.' In 1562 Arthur Brooke printed his English poem 'The Tragical History of Romeus and Juliet,' on which Shakespeare based his drama. In 1562 Boiastuau's French rendering of the tale was translated into English prose by William Paynter in his 'Palace of Pleasure,' which Shakespeare consulted likewise. The theme has often been chosen for operatic purposes. Zingarelli's opera, 'Giulietta e Romeo' appearing in 1796; Bellini's 'I Capuletti ed i Montecchi' in 1830; and Gounod's 'Roméo et Juliette' in 1867. A

dramatic symphony by Berlioz, 'Roméo et Juliette' was composed in 1839.

Römer, ré'mër, or Roemer, Ole, Danish astronomer: b. Aarhuus 25 Sept. 1644; d. Copenhagen 19 Sept. 1710. After study at the University of Copenhagen he was in 1671-81 at Paris, where he made observations in the royal observatory and was elected to the Academy. In 1681 he was made professor of mathematics and director of the observatory at Copenhagen, and subsequently became a councillor of state. Hé is known chiefly as the discoverer of the finite velocity of light, which he determined by observation of the eclipses of the satellites of Jupiter. He found that when Jupiter and the earth were on opposite sides of the sun, the eclipse seemed to occur too late; when on the same side, too early. The extreme deviation from mean time he computed at 11 minutes; it is now known to be approximately 8 minutes 20 seconds, that is, light crosses the space between the earth and the sun (a little less than 93,000,000 miles) in about 8 minutes. (See LIGHT.) Römer invented the transit instrument (1689) and meridian circle (transit and vertical circle combined; 1690). Consult Grant, 'History of Physical Astronomy' (1852).

Romero, rô-mã'rô, Don Matias, Mexican diplomat: b. Oaxaca, Mexico, 24 Feb. 1837; d. Washington, D. C., 30 Feb. 1898. He was graduated from the Academy of Theoretical and Practical Law, Mexico City, in 1855, and admitted to the bar in 1857. In the revolution of that year he supported the government and served as secretary to Melchor Ocampo. In 1859 he was appointed secretary to the Mexican legation at Washington and in 1860-3 was *chargé d'affaires*. He then returned to Mexico where he was commissioned colonel in the army, became chief of staff to General Diaz, and later in the same year resumed his diplomatic career as minister to the United States. He held the portfolio of the treasurer in Juárez's cabinet in 1868-73, was a member of the senate in 1876 and on the election of Diaz to the presidency he resumed his position in the treasury. He was postmaster-general in 1879-80, and in 1882 he was again sent as minister to the United States, where he arranged the boundary question and concluded a reciprocity treaty. He was reappointed in 1884 and continued in the position until his death. He published more than 50 volumes, chiefly of technical reports, among which are: 'Coffee-culture on the Southern Coast of Chiapas' (1875); 'Correspondence of the Mexican Legation at Washington during the French Intervention' (1870-85); 'The State of Oaxaca'; 'Mexico and the United States.'

Romeyn, rô'min, John Brodhead, American Presbyterian clergyman: b. Marbletown, N. Y., 8 Nov. 1777; d. New York 22 Feb. 1825. He was graduated from Columbia in 1795 and was licensed to preach in 1798. He held charges at Rhinebeck, Schenectady, Albany, and New York successively, attained a high reputation as a theologian and was popular as a preacher. He was one of the founders of Princeton Theological Seminary, president of Transylvania University, a trustee of Princeton College and a moderator in the Presbyterian General Assembly. His sermons were collected and published in 1816.

Romilly, rôm'î-lî, Sir Samuel, English statesman and jurist: b. 1 March 1757; d. London 2 Nov. 1818. He entered Gray's Inn to study for the bar, to which he was called in 1783, and gradually rose to distinction in the court of chancery, in which he ultimately took the lead. During the short administration of Fox and Lord Grenville (1806) he was appointed solicitor-general (being member for Queensborough), and knighted. When the Whigs went out of office he remained in Parliament, where he pleaded the necessity of a revision of the criminal code, with a view to the limitation of capital punishment, and a more appropriate regulation of the scale of penalties. To his exertions may be traced the final determination of the executive to the reform and condensation of the various acts in regard to crime, effected under the superintendence of Sir Robert Peel. Consult: 'Memoirs,' written by himself (1840); also 'The Creevy Papers' (1904).

Romney, rôm'nî, George, English painter: b. Beckside, near Dalton-in-Furness, Lancashire, 15 Dec. 1734; d. Kendal 15 Nov. 1802. His father was a cabinet-maker, and the boy learned this trade, but he also taught himself drawing and carved wood, and at 19 was apprenticed to a portrait-painter at Kendal named Steele. In 1757 he entered on his own career as portrait-painter, and after a certain amount of local success went up to London (1762), leaving his wife (whom he married in 1756) and his two children in Kendal. The following year he won a prize offered by the Society of Art for a historical painting, by his 'Death of General Wolf,' and rose steadily in popularity until he held a position beside Reynolds and Gainsborough as a portrait-painter. He visited France twice; once in 1764 and again in 1790, and resided in Italy during the years 1773-5. While in Italy he gave much attention to the works of Correggio, and this, along with his study of the nude, greatly influenced his after-work. In 1783 Romney made the acquaintance of Emma Hart, who afterward married Sir William Hamilton, and she became the model from which he painted such well known pictures as 'St. Cecilia,' 'Joan of Arc,' 'A Magdalene,' 'A Bacchante,' and 'Sensibility.' His 'Lady Hamilton as Circe' sold in 1800 for \$20,210; his 'Lady Hamilton as Sensibility' in the same year for \$15,025. Gradually he began to withdraw from portrait-painting, and give more time to historical and imaginative work. In 1786 Alderman Boydell founded his famous Shakespeare gallery, to which Romney contributed a scene from the 'Tempest' and the 'Infant Shakespeare attended by the Passions'; while about this time he painted 'Milton and his Daughters,' and 'Newton making Experiments with the Prism.' In order to find room for these great imaginative pictures he erected a large studio at Hampstead, which he occupied in 1797. But his health at this time began to fail, and in the summer of 1799 he returned to Kendal utterly weakened in body and mind. He had only seen his wife twice since he left her 35 years before, yet she received and nursed him faithfully through his premature senility and dotage until his death.

The art of Romney displays a certain fitfulness of achievement due partly to the instability of his character, and partly to his defective early training. His defects of technique are most

ROMNEY — ROMULUS

apparent in his historical and imaginative subjects; it is only when we examine his portraits, and especially his female portraits, that we find that beauty of form and subtle charm of color which place him among the greatest portrait-painters of the 18th century.

Consult: Hagley, 'Life of George Romney' (1809); Gamlin, 'George Romney and His Art'; Gower, 'Romney and Sir Thomas Laurence'; J. Romney, 'Memoirs of the Life and Writings of George Romney' (1830).

Romney (W. Va.), **Engagements at.** This place was important as an outpost of the Union troops guarding the Baltimore & Ohio Railroad, and also as a base for operations up the valley of the south branch of the Potomac. It was held early in June 1861 by Col. Angus McDonald, with about 500 Virginia troops and two guns. On the night of 12 June Col. Lew Wallace, with 800 men of the 11th Indiana regiment, went by rail from Cumberland to New Creek Station, and marching across the mountains attacked and routed McDonald on the 13th, and on the same day started on his return by the route he had come. Information of Wallace's movement reached Gen. J. E. Johnston, commanding the Confederate forces at Harper's Ferry, on the morning of the 14th, and supposing it to be the advance of Gen. McClellan's column from West Virginia to co-operate with Gen. Patterson, who was threatening to cross the Potomac at Williamsport, Johnston ordered Col. A. P. Hill, with three regiments, to march on Romney and check the movement (see **NEW CREEK**), burned all the bridges on the Potomac from Harper's Ferry to Williamsport, abandoned Harper's Ferry, and fell back to Winchester. On 23 September Lieut.-Col. Cantwell, with detachments of the 4th and 8th Ohio, a company of cavalry, and one gun, marched from New Creek, drove McDonald's forces from Romney on the 24th, and with a loss of three killed and 30 wounded, returned to New Creek, closely followed by McDonald's cavalry. On 25 October Gen. B. F. Kelley, with detachments of Ohio and West Virginia troops and two companies of cavalry, in all about 2,500 men and two guns, started from New Creek for the permanent occupation of Romney. He captured it on the 26th, after a sharp engagement with McDonald's forces, driving them beyond the town on the Winchester road, and capturing all their trains, two guns, 300 stands of arms, and much camp equipage. A supporting column of the 2d Maryland, Col. Johns, marching from the mouth of Patterson's Creek, through Frankfort and Springfield, was met by the 114th Virginia Militia, under Col. A. Monroe, at the bridge over the South Branch, seven miles from Romney, checked, and fell back to Patterson's Creek, with a loss of six or eight in killed and wounded. On 28 October Gen. "Stonewall" Jackson was assigned to the command of the Valley District, with headquarters at Winchester, and immediately prepared to clear the valley of Union troops. He called out the militia, and being reinforced by Gen. Loring's division from West Virginia, set out late in December to destroy the Chesapeake and Ohio canal, and the Baltimore & Ohio Railroad, and to recover Romney. To withdraw his attention from the railroad, Col. Dunning, in command at Romney, made a demonstration toward Winchester with 2,000

infantry and cavalry and six guns. He marched on the night of 6 Jan. 1862, and next morning at Blue's Gap, 16 miles from Romney, fell upon 700 Virginia militia, under Col. Monroe, scattered them and captured two guns, several prisoners, and some baggage, without the loss of a man, and returned to Romney. On the same day Jackson left the vicinity of Hancock and marched for Romney. Hearing of his approach, the Union troops retreated from Romney on the 10th toward New Creek. Jackson occupied the town on the 14th, and placed Loring's division there in winter quarters. Loring and his officers complained to the Richmond authorities, and the Confederate secretary of war ordered Jackson to move the division back to Winchester, which was done 31 January, and on 7 February the town was again occupied by Union troops, under Gen. F. W. Lander. Between this time and the close of the war the town changed hands several times, but for the greater part of the time was in Union possession. Consult 'Official Records,' Vols. II. and V.

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Romola, rŏm'ŏ-lă, a novel by George Eliot, first published serially in 'The Cornhill Magazine' from July 1862 to July 1863, and issued in book form in 1864. The scene is laid in Florence at the end of the 15th century, and its great figure is Savonarola. The civic struggle between the Medici and the French domination and the religious struggle between Renaissance paganism and ascetic Christianity form the background of the tale. The story proper follows the fortunes of Tito Melema,—a Greek, charming, brilliant, false,—his marriage with Romola of the Florentine house of Bardi, his moral degradation and death. The incidents are many, the local color is rich, but the emphasis of the book is laid on the character of Tito.

Romulus, rŏm'ū-lŭs, mythical founder and first king of Rome. He is said to have been the son of Sylvia, generally, but incorrectly, called Rhea Silvia, daughter of Numitor, king of Alba, and one of the priestesses of Vesta. By the god Mars she became the mother of male twins, whom Amulius, who had usurped the throne of Numitor, ordered to be thrown into the Anio, but the basket containing the two boys, Romulus and Remus, was stranded at the foot of the Palatine Hill. Here a she-wolf, going down to the river to drink, was attracted by their cries, carried them to her cave, and suckled them. Some time afterward chance brought thither Faustulus, the king's herdsman, who took them home and educated them. With him Romulus and Remus spent their youth. When they had grown up Amulius was deprived of his usurped throne by Romulus who reinstated his grandfather Numitor in his dominions. After this the brothers resolved to build a city. Romulus wished to place it on the Palatine, Remus on the Aventine, or on another hill three or four miles down the Tiber. Determining to reach a decision by consulting the augurs, each took his station on his favorite hill; the night passed away, and at the first streak of dawn Remus saw six vultures; but at sunrise, when this news was brought to Romulus, 12 vultures flew by him. Each claimed the augury in his favor; but as their companions decided for Romulus his brother was forced to yield. Romulus,

RONALDSHAY — RONSARD

to outline the boundary of the city, yoked a bullock and a heifer to a plow, marked a deep furrow round the base of the Palatine, and guided by this line began to raise the wall. Remus leaped over the rude rampart in scorn, whereupon the enraged Romulus slew him. According to another tradition Remus fled from the anger of his brother beyond the Alps, and founded Rheims. Romulus was immediately struck with remorse, and could obtain no rest till he appeased his brother's shade by instituting the festival of the Lemuria for the souls of the departed. Thus is Rome said to have been founded in the year 753 (or according to others 752 or 751) B.C. The small number of friends who had followed Romulus were insufficient to people his city. Men enough were gained by making the city a refuge for exiles; but the Roman citizens soon wanted women. Romulus thereupon instituted a religious festival, to which he invited the Sabines with their wives and daughters. In the midst of the festival the unarmed strangers were suddenly attacked, and the Sabine women borne away as captives. The two states thus became engaged in war; but the entreaties of the ravished females, who threw themselves between the contending parties, at length effected a peace, and Rome gained by her union with the Sabines an important addition. According to tradition Romulus ascended to heaven into the company of the gods, after he had completed the work of founding the eternal city; and, until the introduction of Christianity, Rome worshipped its founder in temples expressly dedicated to him.

Ronaldshay, rŭn'ald-shā, **North and South**, two of the Orkney Islands (q.v.), Scotland.

Ronayne, rō-nān', **Maurice**, American Roman Catholic clergyman and author: b. Castlemartyr, Ireland, 2 April 1828; d. Fordham, N. Y., 3 March 1903. He received his education for the priesthood in Ireland and France, and entered the Jesuit Order in 1853. He came to the United States in 1855, was ordained to the priesthood in 1856, taught in St. John's College, Fordham, N. Y., and was for many years professor of history in the college of St. Francis Xavier, New York. In 1898 he returned to the college at Fordham, where he spent the remaining years of his life as spiritual director. His writings upon the labor question may be found in various Roman Catholic periodicals. His most important books are: 'Religion and Science' (1879) and 'God Knowable and Known.'

Ron'cador, one of several Californian drum-fishes of the family *Scianida*, especially the red *Sciana saturna*, and *Roncador stearnsi*, both food-fishes of some importance.

Roncesvalles, rŏn-thēs-vāl'yēs (French, RONCEVAUX, rŏns-vō), Spain, a valley in Navarre, between Pampeluna and St. Jean de Port, where, according to tradition, the rear of Charlemagne's army was defeated by the Arabs in 778, and the brave Roland killed. The battle forms an essential part in the fabulous cyclus of Charles the Great or Charlemagne. (See **ROLAND** and **ROMANCE**.) Roncesvalles, the chief place of the valley, 22 miles northeast of Pampeluna, is traversed by the so-called Gates of Roland, leading over the Pyrenees to France; in the church fabulous antiquities bearing the name of Roland

are shown. The French under Moncey defeated the Spaniards here in 1794, and here Soult took up a strong position in 1813, from which he was dislodged by Wellington.

Ron'co, a West Indian name for various drumfish of the genus *Hamulon*, popular among fishermen and in the market, especially *H. bonariense* (ronco prieto) and *H. parra* (ronco blanco) or sailor's choice.

Rondeau, rŏn'dō, or **Rondo**, originally a short lyric of 13 lines divided into three unequal strophes; the two or three first words form the burden, and are repeated after the 8th and 13th line. The term is now chiefly applied to a musical composition, vocal or instrumental, generally consisting of three strains, the first of which closes in the original key, while each of the others is so constructed in point of modulation as to reconduct the ear in an easy and natural manner to the first strain. The rondeau takes its name from the circumstance of the melody going round after both the second and third strain to the first strain, with which it is finally closed. While it frequently forms the last movement of a sonata or a symphony, it is quite as common as a separate composition.

Ronge, Johannes, yō-hān'nēs rŏng'ē, German Anti-Catholic religious leader: b. Bischofswalde, Silesia, 16 Oct. 1813; d. Vienna 26 Oct. 1887. He studied theology at the University of Breslau 1837-9, was ordained to the priesthood in 1840, and in 1841 became chaplain at Grottkau. Having manifested an opposition to the discipline of the church, he was suspended in 1843. On 1 Oct. 1844, he published a letter against the exhibition of the "holy coat" at Treves, which was soon followed by the organization of the so-called German Catholic congregations. (See **GERMAN CATHOLICS**.) He published in succession a number of pamphlets, in which he called on the Roman Catholic laity and the lower clergy to leave the communion of that church. These were generally understood to be written from the standpoint of deism; and in subsequent years Ronge pronounced himself more and more unreservedly in favor of deistic doctrines. He took part with the radicals in 1848, and was obliged to flee to London, where he signed in 1851, with Ruge, Struve, Kinkel, and others, a democratic manifesto to the German people, and where he became the leader of a free congregation. In consequence of the amnesty granted by the Prussian government, he in 1861 again made his appearance in Breslau. He founded a reform association at Frankfort-on-the-Main in 1863, and from 1873 resided at Darmstadt. Consult the article 'Deutschkatholiken' in Wetzer und Welte's 'Kirchenlexikon.'

Ronsard, Pierre de, pē-ār dé rŏn-sār, French poet: b. Chateau de la Poissonnière, Vendômois, 11 Sept. 1524; d. St. Cosme near Tours, 27 Dec. 1585. He entered as page the service of the dauphin, and then of the Duc d'Orléans, 2d son of the king. In 1538 he accompanied James V. of Scotland and his bride Marie de Lorraine back to their kingdom, and remained at the Scottish court three years. He also spent six months at the English court, and was then employed in a diplomatic capacity in Germany, Piedmont, Flanders, and Scotland.

ROOD — ROOF

On his return to France he devoted himself with great eagerness to the study of literature. With a group of followers, self-styled the "Pleiade," he cast away the literary traditions and ideals of mediæval France, and sought inspiration from the Latin and Greek classics. The result was transformatory, and Ronsard's influence on the progress of French letters was thus very great. In the Floral Games at Toulouse he triumphed over his competitors, and received a silver statue of Minerva, which he presented to Henry II. He was greatly esteemed by that prince, and by his successors, Francis II. and Charles IX.; obtained the abbey of Bellozane, and was also prior of St. Cosme. His writings, consisting of sonnets, madrigals, eclogues, lyric pieces, elegies, and satires, and a fragment of an epic poem, 'La Franciade,' were read with almost incredible admiration by his contemporaries, and brought him valuable presents from Queen Elizabeth of England and the imprisoned Queen of Scots. Many of his sonnets and odes possess considerable merit, but his style is marred by affectation, and his pages are filled with freshly imported words from the classic languages. There are editions by Blanchemain (1856-67) and Marty-Laveaux (1887 et seq.).

Rood, Ogden Nicholas, American physicist: b. Danbury, Conn., 3 Feb. 1831; d. New York 12 Nov. 1902. He was graduated from Princeton in 1852 and afterward studied at Yale and at the universities of Munich and Berlin. He was appointed to the chair of physics and chemistry at the University of Troy in 1858, and in 1863 accepted the chair of physics at Columbia where he remained until his death. In his researches and experimental work he showed great originality and skill, his specialties being in the fields of mechanics, optics, acoustics, and electricity. His original experiments included the application of stereoscopic photography to the microscope, the quantitative analysis in color contrast, the measurement of the duration of flashes of lightning, and he was the first to describe a photometric method that is independent of color. He was a leading member of the prominent scientific societies, author of nearly 100 monographs and also wrote: 'Modern Chromatics' (1881); 'The Voice and the Ear'; etc.

Rood, a cross. The term is more particularly applied to the large cross erected in Roman Catholic churches over the entrance of the chapel or choir; this is often of a very large size, says the 'Glossary of Architecture,' and when complete is like other crucifixes, accompanied by the figures of Saint John and the Blessed Virgin, placed one on each side of the foot of the cross; but these are more often omitted. The rood loft was the gallery in which the cross was set to view, and the rood-arch was the arch between the nave and the chancel, that is, the arch over the rood-loft. Rood-lofts became common in England in the 14th century, were ordered taken down by the government in the 15th and 16th centuries, and temporarily were restored under Queen Mary. See the Irish Constitution of 1635, p. 110.

Rood. See WEIGHTS AND MEASURES.

Rood-screen, a screen of wood, stone, or wrought iron, separating the western end of the ritual choir from the nave in many churches, and forming a support for the rood, a cross or cru-

cifix, placed in the centre of the rood-beam. Sometimes the rood-screen was double with vaulting between and a rood-loft over it, as at Southwell Cathedral. It was frequently ornamented with niches in which were placed statues, as at York Minster and Rochester Cathedral.

Roof, the covering of a building by which the interior secures protection. In ordinary acceptance the term includes the covering and the supporting framework, though in carpentry the term is applied only to the framework. Roofs are broadly distinguished as flat or sloping. The former were used almost exclusively among ancient peoples and are at present employed largely in Eastern countries where the roof is

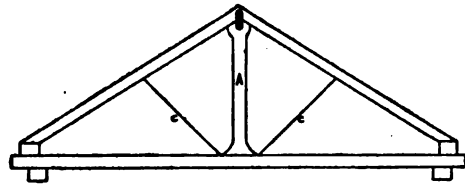


FIG. 1.

devoted to some extent to domestic purposes. The sloping roof, being to a great extent an ornamental consideration, has given way to the flat roof in modern business buildings, where economy of construction prevails. Flat roofs are usually covered with tar, metal, asphalt or gravel. The framework of the roof has, until the modern application of iron to this use, been almost exclusively of timber; and the end desired has been to arrange the timbers in such relations as to secure the greatest strength and stiffness consistent with the minimum of weight; also to avoid lateral strain or thrust upon the walls. The form chosen has been that of two or more inclined planes for the slopes of the roof over the enclosed space. Two inclined planes are formed by a series of sloping rafters having the lower ends tied together to prevent spreading. The upper ends forming the angle of the roof and connected by the ridge-piece. The method of tying the rafters is by a horizontal beam laid across the span, receiving at each end the foot of one of the rafters, the two being securely mortised. This is called a tie-beam. When the roof is of wide span it becomes necessary to secure the tie-beam against settling in the middle, and this is done by joining the centre of the tie-beam and the ridge angle of the rafters by a king-post (A in Fig. 1).

Sometimes two vertical beams are suspended from the rafters to the tie-beam, and these are called queen-posts (BB in Fig. 2).

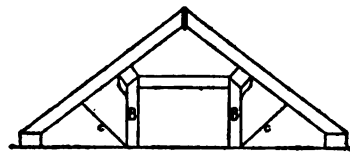


FIG. 2.

Braces or struts (c) may be carried from the foot of the suspended posts to the rafters to afford additional stiffness to the frame. Further support is given to the rafters in roofs of long span by one or a series of transverse

ROOFING TILES — ROON

longitudinal beams called purlins. Early Christian basilicas, of which San Miniato in Florence is typical, had roofs of the character just described. When the period of Gothic architecture was reached the king-post and tie-beam was carved and molded, in cases where wooden roofs were used instead of stone vaulting. Open timber roofs were used in England more than on the Continent for churches and halls. The finest example is that of Westminster Hall (Fig. 3) completed in 1399 and having a span of 68 feet.

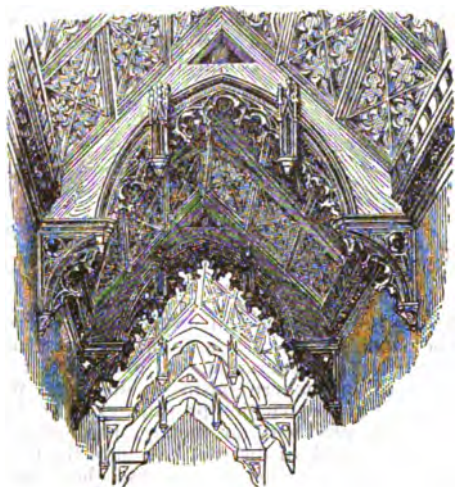


FIG. 3.

In this example the central part of the tie-beam is cut away, and the great rigidity of the framework prevents any inordinate thrust upon the walls.

The inclination or pitch of the roof seems to be regulated by taste, after the general law is observed that countries of moist climate require a sloping roof to carry off the rain and snow. The slope of a Greek pediment, marking that of the roof, varied from 15° to $16\frac{1}{2}^{\circ}$; Roman roofs, the roofs of Romanesque buildings, and also those of the Renaissance era, generally carried an inclination increased one quarter to that of Greek buildings. The Gothic pitch sometimes reached to 50° or 60° . But since the period of the prevalence of one particular style, great latitude has been observed, Germany and the Netherlands favoring a steep roof, and France retaining a moderately steep inclination even in her Renaissance structures; but England has tended toward the lowering of the pitch.

The commonest form is the gable roof where each end terminates in a gable. Modifications of this are the curb-roof in which the slope is broken; further distinguished as the gambrel roof where only two opposite sides are sloping; the French roof where the slope beneath the curb approaches almost to verticality and that above is nearly flat or with a slightly visible slope; the Mansard roof, named after its designer, Mansard, where the slope beneath the curb is pierced by dormer windows. The hipped roof is one having a double pitch and no gables, and the ridge shorter than the parallel wall plates. The pyramidal roof is one where the ridge is so short as to approach a point. Various

modifications of these general forms are known by a variety of names.

The recent use of iron for roof-frames has become very general, especially where wide spans are required as in the case of railway train sheds. The general principles of construction employed in wooden frames are utilized in iron ridge roofs; but for oval or conical roofs, the iron trusses require a consideration of the principles governing those of bridge trusses. See BRIDGES.

The covering of sloping roofs is of various material, such as thin slabs of stone, thatch, tiles, slate, metal, shingles and cement.

Roofing Tiles. See TILES.

Rook, a European crow (*Corvus frugilegus*), having the base of the bill, forehead and upper part of the throat naked. The rook possesses a voice much less harsh than that of the crow. Rooks are gregarious in habits, and nest in great communities or rookeries, thus differing from other species of the family. The nests, which are placed in tree tops, are built or repaired early in March, and the young are hatched in April. The food consists chiefly of grubs, although grain appears to form part of the dietary. In Great Britain the rook is a permanent resident or partial migrant, but in other parts of Europe these birds appear to be more or less strictly migratory. The same species is found in Asia, where related species having the facial feathers only partially deciduous also occur.

Rooke, rûk, **SIR George**, English admiral: b. 1650; d. 24 Jan. 1708-9. At an early age he entered the royal navy, and in 1694 became one of the lords commissioners of the admiralty and admiral. He distinguished himself in the fight against the French and Spanish fleets in Vigo Bay (1702), and at the capture of Gibraltar in July 1704. On 9 Aug. 1704 he fell in with a French fleet of much superior force, under the Comte de Toulouse, off Malaga, and an engagement, which lasted nearly the whole day, ensued. Victory remained with the English, though none of the French ships were captured. The news of the Malaga victory reached England during the celebration over Blenheim, and Rooke's name was put forward for honors along with Marlborough's; but being a Tory he suffered from the jealousies of the Whigs, the dominant power. His command was taken away from him and he retired in disgust to his family seat in Kent.

Rookwood Pottery. See POTTERY.

Roon, rôn, **Albrecht Theodor Emil von**, Prussian soldier: b. Pleushagen 30 April 1803; d. Berlin 23 Feb. 1879. He entered the army in 1821; was attached to the Topographical Bureau in Berlin, 1833-5; became captain in 1836, and major in 1842; in 1848 became chief of staff of the 8th army corps at Coblenz, took part in the campaign at Baden of that year; and was promoted lieutenant-general in 1859. In the latter year he was appointed a member of a commission on the reorganization of the army. He had given special attention to this subject for many years, but his proposals which were in effect an extension with modifications of Scharnhorst's system, embracing a universal three years' service and a reserve were carried only after long opposition. The Austrian war of 1866 demonstrated that value of his sys-

ROOS — ROOSEVELT

tem. He attended the German emperor throughout the Franco-Prussian war, and was created a count in 1871. The ministry of war which he had held since 1859 he resigned in 1871 together with the ministry of marine, held since 1861. In 1872 he succeeded Bismarck as president of the Prussian cabinet and was made field-marshal shortly after; but soon resigned. He was the author of several works on geography published between 1832 and 1839.

Roos, Johann Heinrich, German painter: b. Otterberg, in the Palatinate, 27 Oct. 1631; d. Frankfort-on-Main 3 Oct. 1685. He came to Amsterdam and applied himself to landscape and animal painting. After a visit to Italy he settled finally at Frankfort. Most of his landscapes are in the conventional Italian style.

Roo'sa, Daniel Bennett Saint John, American ophthalmologist: b. Bethel, N. Y., 4 April 1838; d. 8 March 1908. He was graduated from the University of New York in 1860, served as assistant surgeon in 1861 and became resident surgeon at the New York Hospital in 1862. He studied in Europe and in 1864 began practice in New York. From 1863-82 he was professor of diseases of the eye and ear at the University of New York, 1875-80 at the University of Vermont.

Roosevelt, rō'zē-vēlt, Nicholas J., American inventor: b. New York 27 Dec. 1767; d. Skaneateles, N. Y., 30 July 1854. He engaged in manufacturing and inventing in New York and was connected with Robert R. Livingston and John Stevens in experimental boat-building. In 1798 he conceived the idea of a vertical wheel, a suggestion which made steam navigation a success. The first experiment was made in a boat launched in 1802 and propelled by the vertical wheels. In 1809 he was associated with Fulton in the introduction of steamboats into western waters and in 1811 built and launched the New Orleans with which he made a pioneer trip down the Ohio and Mississippi rivers in 14 days. He obtained letters patent from the United States government in 1814 protecting his invention, but was denied protection by the New Jersey legislature. Fulton never claimed the invention as his own, but Roosevelt's title to it has never been legally proved.

Roosevelt, Robert Barnwell, American author and politician: b. New York 7 Aug. 1829; d. Sayville, L. I., 14 June 1906. He was admitted to the bar and practised law in New York until 1871, when he was elected to Congress. In 1888 he was appointed minister to the Netherlands and served two years. His most important public service, however, was in the establishment of the United States Fish Commission, of which measure he was the originator and promoter while in Congress.

Roosevelt, Theodore, American politician and author, 26th President of the United States: b. New York 27 Oct. 1858. He was educated privately and at Harvard, from which he was graduated in 1880; then for a year traveled in Europe, which he later at intervals revisited; and in 1881 published his first book, 'The Naval War of 1812,' characterized, like his subsequent works, by creditable research, general accuracy, and vigorous statement. He came into politics as a champion of civil-service principles. In the autumn of 1881 he was elected to the State assembly of New York from the 21st district, and he served in that body continuously until

1884. He introduced into the assembly the first civil-service bill, passed in 1883. In 1884 he was chairman of the New York delegation to the national Republican convention. He was nominated in 1886 as an independent candidate for the New York mayoralty, but, though he received Republican endorsement, was defeated by Abram S. Hewitt (q.v.), candidate of the United Democracy, who was elected by about 22,000 plurality. In May 1889 he was made by President Harrison a member of the United States civil-service commission, in which post he continued until May 1895. During this six years' incumbency he strictly endeavored to apply the test of merit to all executive positions, with the result that the commission assumed a position of importance it has never since lost, and civil-service law gained a new vitality. At the beginning of his term of service, 14,000, at its close, 40,000, employees held their positions under the rules of the civil-service. From the civil-service commission he resigned to become president of the board of New York police commissioners during the administration of Mayor Strong. At once he undertook the task of thorough reorganization. Among the principles insisted on by him was an impartial application of the civil-service idea to appointments to the police force and promotions in it. By his rigorous enforcement of laws and ordinances he gave unwonted effectiveness to the office. This post he relinquished in 1897 to become assistant-secretary of the navy to Secretary John D. Long (q.v.), in the first administration of President McKinley. Quickly acquiring the extensive detailed knowledge necessary to his post, he began to urge that preparation of the navy for warfare which contributed so signally to the triumph of American arms in the Spanish-American war. He called for two appropriations of respectively \$800,000 and \$500,000, for ammunition for naval target practice; and though this was at the time deemed extravagant, it was later amply justified by the skill of American gunners as shown at Manila and Santiago. On 6 May 1898 he resigned his assistant-secretaryship to enter the army. His experience in 1884-8 in the 8th regiment N. Y. N. G., in which he had for a time served as captain, furnished some basis for his military career. He joined Leonard Wood (q.v.), captain and surgeon, U. S. A. (now major-general, U. S. A.), in recruiting the 1st United States volunteer cavalry, of which he became lieutenant-colonel, with Wood as colonel. Notwithstanding he was second in command, his regiment, composed to a large extent of cowboys and western hunters, was popularly known as "Roosevelt's Rough Riders." On 1 July 1898 he led the victorious charge of the "Rough Riders" and the 9th cavalry up San Juan hill, on 11 July was promoted colonel and in September was mustered out. On 27 September he was nominated as Republican candidate for the governorship of New York obtaining 753 ballots to 218 for Governor F. S. Black (q.v.). He entered on an active campaign, and was elected by a plurality of 18,079 over his Democratic opponent, Judge Augustus Van Wyck (q.v.). He at first declined to sanction the use of his name in connection with the vice-presidency in McKinley's second campaign, but ultimately yielded, and was nominated by acclamation at the national Republican convention at Philadelphia 21 June 1901. He immediately set out on an aggressive speaking tour, extend-

ing to the Far West. The assassination of President McKinley placed him in the Presidential chair. On 14 Sept. 1901 the oath of office was administered by United States District Judge John R. Hazel. Upon his accession he announced that he would unbrokenly continue the policy of McKinley, whose cabinet he retained. In November 1904 he was elected for the full term by a plurality of over 2,000,000 votes, the largest plurality ever given any Presidential candidate. Almost immediately after the expiration of his second term of office as President of the United States (23 March 1909), Mr. Roosevelt, with a large party and ample equipments, sailed for the wilds of Africa to hunt the beasts of the Jungle and otherwise to divert himself. Numerous specimens of game and fauna were shipped to the Smithsonian Institution, which outfitted the expedition.

Returning to civilization in the spring of 1910, Roosevelt passed through Egypt, Italy, France, Belgium, Austria, Germany, Holland, Denmark, Norway, and Sweden—every large country of Europe save Russia—being everywhere received with honor. He lectured to audiences in Egypt, Germany, France, England, and Norway, where he was awarded the Nobel Peace Prize on account of his share in promoting peace negotiations between Russia and Japan. Before he had reached England in his homeward trip, President Taft appointed Mr. Roosevelt envoy extraordinary to represent the United States at the funeral of Edward VII. In London he was given the freedom of the city, and there addressed the Englishmen on their Egyptian policy—an address which aroused considerable comment, as did his earlier lecture to the students at Egypt. In France he discussed his favorite race-suicide views, and in Berlin lectured on "Biological Analogies in History." Roosevelt returned to America 18 June 1910 and was enthusiastically greeted by the citizens of New York. In 1912 he was nominated at Chicago for President by the Progressive National Party (q.v.) and entered upon an active campaign, speaking in many states. On 14 October, at Milwaukee, he was shot and dangerously, though not fatally, wounded by John Schrank, who had followed him from city to city, intending to assassinate him.

He has written: 'Hunting Trips of a Ranchman' (1883); a 'Life of T. H. Benton' (1886); a 'Life of Gouverneur Morris' (1887); 'Ranch Life and the Hunting Trail' (1888); a 'History of the City of New York' (1890); 'Essays on Practical Politics' (1892); 'The Wilderness Hunter' (1893); 'The Winning of the West' (1889-96); 'American Ideals' (1897); 'The Rough Riders' (1899); a 'Life of Oliver Cromwell' (1900); 'The Strenuous Life' (1900); 'California Addresses' (1903); 'Maxims of Theodore Roosevelt' (1903); 'Addresses and Presidential Messages' (1904). He wrote also in 'Hero-Tales from American History' (1895; with H. C. Lodge); and 'The Deer Family' (1902; with several others). The best of his books is 'The Winning of the West,' the narrative of the conquest of United States territory west of the Alleghenies. Consult: Leupp, 'Roosevelt, the Man' (1904); Bigelow, 'President Roosevelt' ('Contemporary Review,' vol. 80, 1901); Rod, 'Le Président Roosevelt d'après son Œuvre Littéraire'

('Correspondant,' vol. 205, 1901); Brooks, 'President Roosevelt' ('Fortnightly Review,' vol. 81, 1904); Riis, 'Theodore Roosevelt, the Citizen' (1904).

Roosevelt Dam, the greatest engineering work in connection with the Salt River irrigation project in Arizona, which ranks first among the works of the United States reclamation service, was completed in 1910. This wonderful structure of sandstone and cement, costing nearly \$9,000,000, rises 284 feet above Salt River. It is 1,080 feet long on top and 170 feet thick at the base. Its foundation covers one acre of ground. Placed by the side of a twenty-story building, it would rise ten feet above it, while its length on top would be more than two city blocks. Across its top is a roadway twenty feet wide. The reservoir created by the Roosevelt dam is the largest artificial body of water in the world. Its capacity is sixty-one billion cubic feet, and if its water were spread over the State of Delaware it would cover the entire surface of the State a foot in depth.

Root, root or rút, Elihu, American lawyer and statesman: b. Clinton, N. Y., 15 Feb. 1845. He was graduated from Hamilton College in 1864, and from the New York University Law School in 1867. In the latter year he was admitted to the bar and entered upon the practice of his profession in New York. In 1883 he was appointed United States District Attorney for the southern district of New York; in 1894 was a delegate-at-large to the New York State Constitutional Convention, and was chairman of the judiciary committee. He was appointed Secretary of War by President McKinley in 1899 and reappointed in 1901. He found the work of his department in disorder with constant rivalry among its various bureaus, but by strict discipline, adherence to civil-service rules, and establishing a system of promotion for merit, he soon brought order into the administrative departments, and turned his attention to the organization of the army. In this field he brought about a number of improvements, chief among which are the assimilation of the militia with the regular army and the creation of the General Staff. He also had charge of the military administration of Cuba and the Philippines; and while he was severely criticised for not trying to prevent cruelties in the conquest of the Philippines, he must also be given credit for the policy of the army in enforcing sanitary measures, and preparing for independent government in Cuba; and for the restoration of order and preparation for civil government and the work of the Philippine Commission in the Philippines. In January 1904 he retired from the secretaryship to resume the practice of law. On 19 July 1905 he was appointed Secretary of State. In 1909 he was elected United States Senator from New York, and in 1912 was elected permanent chairman of the Republican National Convention at Chicago.

Root, George Frederick, American musician and song-writer: b. Sheffield, Mass., 30 Aug. 1820; d. Bailey's Island, Maine, 6 Aug. 1895. He removed to New York where he taught in 1844-50, studied in Paris for a time in 1850, and in 1859 went to Chicago where he became a member of the music-publishing firm of Root & Cady. He was the originator of normal musical institutes and did much to im-



**THEODORE ROOSEVELT,
TWENTY-SIXTH PRESIDENT OF THE UNITED STATES.**

ROOT—ROPES

prove the standard of music in this country, founding a school of distinctively American music. His song 'The Battle-Cry of Freedom' (1861) gained immediate popularity and at one time 14 printing-presses were engaged in printing it. 'Tramp, Tramp, Tramp, the Boys are Marching' (1864), though written so nearly at the close of the war, nevertheless gained a wide sale. In a catalogue of 114 war songs 36 were from his pen. Among his songs are; 'Hazel Dell' (1853); 'Rosalie, the Prairie Flower' (1855); 'Just Before the Battle, Mother' (1863); 'Old Potomac Shore'; etc. He also wrote the quartet 'There's Music in the Air' and the cantatas 'The Flower Queen' (1852) and 'The Haymakers' (1857).

Root, that part of a plant which, normally, penetrates the soil, absorbs water and chemicals in solution, for nutritive purposes, forces it through the plant, and also acts as an anchor and support. Roots, however, may also, in modified forms, draw nutriment from other vegetation, or from the air, and may even serve as support and aid to climbing-plants. Low forms of vegetation, and certain submerged aquatics able to absorb water through most of their tissues, have no roots, or only enough to act as anchors.

The primary form of root is that which, starting from the germinating seed, secures it to the ground, and strikes downward into the soil, sending off horizontal branches which in turn branch, until the ground occupied by the fibrous reticulation is thoroughly exhausted of food. In many cases, however, this single central tap-root, so-called, is missing, and numerous horizontal and lateral roots take its place. The growth of the root-system is commensurate with that of the plant above ground. In epiphytes, the roots either adhere to the site of the plant, to hold it in place, or depend freely in the air, drawing nourishment therefrom.

Plants are called annuals, biennials or perennials, according to the length of time the root lives, but the differences are not always absolute, and are often changed by cultivation. Biennials and perennials, especially the former, are apt to have thickened, tuber-like roots, in which nourishment is stored during the growing periods, to be drawn upon when the plant flowers, as in beets and carrots.

Each root is a naked organ, incapable of bearing leaves, which has a blunt apex shielded by a root-"cap" more or less distinct, of old and firm cells. The growing cells of the root lie directly behind this cap, and still further back is a zone of delicate tubular root-hairs, which are devoted to the absorption of liquid foods from the soil, and are constantly dying off and being renewed on the side next the root-cap. The growing tip with cap and root-hairs, continually pushes forward into the soil, while the older portions become inactive so far as absorption is concerned, thicken, envelop themselves in cork, and increase their means of conducting water from the region of the root-hairs to the rest of the plant.

Roots may be produced from stem-nodes, branches, or even leaves (as in begonia), and are then called adventitious. A familiar example of this is found in the aerial roots of banyan and mangrove, which start from the branches

and eventually penetrate the ground, and which not only assist in feeding the trees, but also help to support their gigantic heads. Vines, such as the poison-ivy, have masses of aerial rootlets springing from the stem and fastening it firmly to its support.

The haustoria of certain parasitic plants are a form of reduced roots, and are special organs of absorption which "arise from the internal tissues of the parasite, and possess, in a marked degree, the capability of penetrating to a considerable depth into the body of the host plant by means of solvent ferments and the pressure resulting from their own growth." Once there, they draw sustenance from their host, and often dispense with assimilative organs of their own.

Other parasites have disk-like haustoria upon their root-systems, which fasten upon the roots of other plants, and, although appearing above ground like self-supporting herbs with green foliage, vigorously assimilative, these plants do not reach full development without this clandestine connection. The young roots of saprophytes, or plants living upon the decaying remains of vegetation, seem to require the co-operation of fungi in obtaining food.

The connection of bacteria and leguminous plants is becoming well known. The bacteria penetrate through the root-hairs of the *Leguminosæ*, into the cortex of the root and there raise tubercular growths while living on the carbohydrates furnished by the host. But these bacteria, capable of fixing free nitrogen, furnish the host plant with a steady supply of nitrogenous food. The tubercles are most numerous on legumes growing in poor soil, and by plowing the legumes under the ground they decay, returning the nitrogen to the soil in a form available for the next crop. This process is called green manuring, and is a good treatment for exhausted, non-nitrogenous soils.

Root, in philology. See SCIENCE OF LANGUAGE.

Root and Branch Men, in British politics, a party in the House of Commons and out of it who supported a petition signed by 15,000 London citizens, praying that episcopacy might be destroyed "root and branch." Nathaniel Fiennes, Sir Harry Vane, and Hampden were of the party. A bill to give effect to the petition was read a first and second time in 1641, but was ultimately dropped.

Root-worm. See GRAPE INSECT-PESTS.

Rope. See CORDAGE.

Ropes, Arthur Reed ("ADRIAN ROSS"), English dramatist and poet: b. Lewisham, Kent, 23 Dec. 1859. He was educated at Cambridge. Among his numerous dramatic productions are: 'Faddimer' (1889); 'In Town' (1892); 'Gaiety: a Greek Slave' (1898); 'San Toy' (1899); 'The Messenger Boy' (1900); 'Gaiety: a Country Girl' (1902). He has also published: 'Poems' (1884); 'Short History of Europe' (1889); 'On Peter's Island' with Mary E. Ropes (1901); etc.

Ropes, John Codman, American military historian: b. Saint Petersburg, Russia, 28 April 1836; d. Boston, Mass., 28 Oct. 1899. He was graduated from Harvard in 1857, and from his admission to the bar in 1861 until 1870, practised law in Boston, but devoted the remainder of his

life to historical writing. As the founder of the Military Historical Society of Massachusetts he started the movement for the collection of historical data relating to the Civil War by the United States Government. He spent much time also in the collection of material bearing upon the life of Napoleon. His published books are: 'The Army Under Pope' (1881); 'The First Napoleon' (1885); 'The Campaign of Waterloo' (1893-4); and 'The Story of the Civil War' (1894-9).

Rops, rôps, Félicien, Belgian artist: b. Namur 1833; d. 1898. His illustrations for the 'Crocodile,' a journal published at Brussels, appeared for the first time in 1855 and established his reputation as an artist of original genius. But his main employment from that date was book illustration, and many novels of the day have been published with his brilliant pictures, which reflect the cynical spirit of some modern literature with great imaginative power. Many of his drawings are, however, too sheerly naked and unreserved to be pleasing. But his etchings are almost unique in power of execution, especially the series known as 'Sataniques' which while they belong to decadent art are masterpieces of technique. He founded the International Society of Etchers at Brussels and has had a great influence on modern schools of art in Europe. Consult Ramiro, 'Catalogue de l'Œuvre Gravé de Félicien Rops' (1887).

Roque, rôk. Croquet and roque are two varieties of the same game. Croquet is played upon a grass lawn on which the boundaries of a rectangular court are indicated by a chalk line, or by a slight ridge. Roque is played on a specially prepared earth court, with the corners cut off diagonally, the borders curved upward and bounded by india-rubber cushions. In each game the object of each player is to drive his playing ball, by means of a mallet, through a series of iron arches, each in its proper order, and from the proper side, and to strike a peg driven into the ground for that purpose, in the fewest number of "turns" at play. After the first stroke a player may continue, if he has by that stroke either run through the proper hoop or hit another ball with his. In the former case he may try at another hoop, in the latter he must take his own ball to that which he hit with it, and, after placing them side by side, hit his own ball in such a manner that the impact of the blow will move the two. After that he may attempt to run through the next arch, or to hit some other ball with his. Should he fail in any shot he loses his "turn," and his opponent takes up the play.

In croquet the size of the court has varied a good deal, with a tendency to become smaller; 80 feet long by 45 feet wide is a usual measurement, but that depends upon the number of hoops or arches used, which may vary from six to ten; and upon their position with regard to each other. The preferable arrangement is that known as the "Championship" or "Six hoop" plan. The croquet balls are three and five eighths inches in diameter, and weigh fourteen and a half ounces each. The mallets vary from two feet nine inches to three feet in length. The width of the arch of the hoops is three and three quarter inches. Any number of couples of players may play, up to four.

Roque is a much more scientific variety of the game. The court is 72 feet long and 32 feet wide, rectangular, with each corner, for eight feet, cut off diagonally. The surface is well rolled dirt sprinkled with sand. It is surrounded with rubber cushions, so that caroms can be made off the balls the same as they are in billiards. All the arches, of which there are eight, are three and a half inches in diameter. In the centre of the court is a tunnel or cage the arch of which is three and one eighth inches, and it is 18 inches in length. The balls are of hard rubber and are three and a quarter inches in diameter. The mallets' heads are seven and a half inches long, by two and a quarter to two and a half inches in diameter, with a handle from 8 to 15 inches long. Only two players play against each other, each playing two balls.

Both games have elaborate rules which must be studied carefully to obtain a full appreciation of either game. Croquet is the descendant of the old game of "Pall Mall," popular in England up to 1700; but that game died completely out of knowledge, except in a remote corner of Ireland, from whence it emerged as croquet in the middle of the 19th century. It became a very popular game in Great Britain, from whence it passed to America and became equally popular. In both countries it suffered a partial eclipse on the introduction of lawn tennis. It is played in the west on grass as croquet and in the east on the courts above described as roque. For croquet rules, etc., consult 'The Complete Croquet Player' (1896); for roque consult Spalding, 'Athletic Library' (1893).

Roquefort, rôk-fôr, France, a village in the department of Aveyron in the vicinity of which large quantities of the well known variety of cheese of the same name is made from ewe milk.

Roqueplan, Joseph Etienne Camille, zhô-zêf â-tê-ên kâ-mêl rôk-plân, French painter: b. Mallemort, Bouches-du-Rhône, France, 1802; d. 1855. He studied at Paris under Gros and Pujol. His two pictures exhibited at the Salon of 1827 and illustrative of Sir Walter Scott's writings won him a place among the leaders of modern French painting. His most remarkable works include 'The Amateur Antiquary'; and 'The Well near the Tall Fig-Tree.' He was equally successful in genre and landscape, and his faithful transcripts of Pyrenean scenery are among the most delightful of modern French pictures.

Roquette, rô-kêt', Otto, German author, critic and poet: b. Krotoschin, Posen, 19 April 1824; d. Darmstadt 18 March 1896. Educated at Heidelberg, Berlin, and Halle, he taught at Dresden until his 39th year, at Berlin in 1862-9, and then in the Darmstadt Technische Hochschule, where he was professor of German language, literature, and history. He wrote an excellent history of German literature (1872; 3d ed. 1879); the novels, 'Im Haus der Väter,' 'Das Buchstabirbuch der Leidenschaft,' and 'Die Prophetenschule'; two volumes of dramatic poems (1867-76), and lyrics and tales.

Roraima, rô-râ'ê-mâ, a mountain of South America, in lat. 5° N., on the boundary of British Guiana and Venezuela. It is 8,740 feet high, the top forming a rugged rocky plateau, and the steep rocky sides render the summit almost

inaccessible. It was ascended in 1884 by Mr. Everard im Thurn. The flora and fauna of the summit are scanty.

Ror'er, Sarah Tyson, American teacher of domestic science: b. Richboro, Pa., 18 Oct. 1849. She was graduated from the academy at East Aurora, N. Y., and was married in 1871 to W. A. Rorer. She was for many years principal of the Philadelphia School of Domestic Science, and has lectured widely. She was editor and part owner of 'Table Talk' in 1886-92, edited 'Household News' in 1893-7, and since then has been on the editorial staff of the 'Ladies' Home Journal.' She is also director of the Pennsylvania Chautauqua School of Domestic Science. Her publications include: 'Mrs. Rorer's New Cook Book'; 'How to Use a Chafing Dish'; 'Colonial Cookery'; 'A Book on Diet and Cookery'; etc.

Ro'ric Figures (Fr. *figures roriques*, from Lat. *ros*, dew), a name applied to certain curious images rendered manifest upon breathing on polished solid surfaces, when these have been previously exposed to contact or close proximity of the objects thus represented, and usually at the same time acted upon by light, heat, or electricity. The singularity of these phenomena is, that they consist usually in the production at the first of a sort of latent or invisible image, but this may afterward be developed or brought out, somewhat in the manner of photography.

Rorkes (rôrks) Drift, Africa, a post station on the Tugela River, in Natal, memorable for the heroic defense of a British force of 80 men under Lieutenants Bromhead and Chard. They were guarding the hospital and the commissariat, when they were attacked by a Zulu force of 4,000, the night of 22 Jan. 1879. The British used biscuit boxes and rice bags for a barricade, and kept the enemy at bay until relieved the morning of the 23d. Six times in succession the little force drove out Zulu warriors who had got within the barricade.

Rorqual, rôr'gwâl, a name which is of Scandinavian origin, and signifies a whale having longitudinal furrows on the belly. As generally employed, it comprises the finback, sulphurbottom, and humpback whales, or the subfamily *Balænopterinæ*, exclusive of the genus *Rhachianectes*. The sulphurbottom is a particular kind of finback, characterized by great size, a mottled coloration, and various osteological peculiarities. In the North Atlantic there are three species of finbacks, one species of sulphurbottom, and one species of humpback. The finbacks are the common finback (*Balænoptera physalus*), the pollack whale (*B. borealis*), and the little piked whale (*B. acuto-rostrata*). The whale which is most frequently seen on the east coast of the United States, and of which stranded individuals are found every year at different points, is the common finback, *B. physalus*. It is from 60 to 70 feet long when full-grown, and is readily distinguishable by its gray and white striped whalebone, gray upper surfaces, and white belly, and under surfaces of pectoral fins and flukes. The dorsal fin, which is rather more than a foot high, is situated a little in advance of the last fourth of the length of the body. Though numerous

species of finbacks and humpbacks have been described from different parts of the world, the five forms above mentioned are everywhere recognizable. If others exist they at least resemble these very closely. The sulphurbottom feeds on small crustaceans, and the finbacks and humpbacks on various fishes, such as the cod, pollack, herring, capelin, etc. They all engage in seasonal migrations. During the summer months great numbers congregate about Newfoundland, Iceland, and the north of Norway. For gray whale, or hardhead, and further information relating to finbacks and humpbacks, see WHALE.

Rory O'More, rô'rî ô-môr', a novel by Samuel Lover, published in 1836. In spite of its stilted style and improbable incidents, this story is valuable in its delineation of Irish character, and in its picture of the Irish uprisings at the close of the 18th century.

Rosa, rô'zâ, **Carl Augustus Nicholas** (originally Rose), German opera conductor: b. Hamburg 22 March 1842; d. Paris 30 April 1889. He studied violin playing at Leipsic, made a tour at 12; and gained the violin prize at the Paris Conservatoire. He came to America as conductor of Mr. Bateman's concert tour, and met the singer Euphrosyne Parepa, to whom he was married in 1867. His opera company, headed by Mme. Parepa-Rosa, included Wachtel, Santley, Ronconi, and Formes. In 1871 he became manager of the Carl Rosa Opera Company in London and produced operas in English both in London and in the provinces until his death.

Rosa, rô'sâ, **Salvatore** or **Salvator**, Italian painter: b. Renella, near Naples, 20 June 1615; d. Rome 15 March 1673. His eldest sister having married Francesco Francanzano, a painter, Salvator from him acquired a taste for art. He then became a pupil of Falcone and Ribera (q.v.). But his taste was formed by the study of nature among the wilds of the Apennines rather than by other artists. During one of his rambles in the Abruzzi he was seized by brigands with whom he is said to have associated for some time, but left them at last and went to Naples, where he worked in such want that he was often obliged to sell his pictures to the meanest hucksters and for a pittance. At last one of his pictures was observed by the painter Lanfranco, who recommended Salvator to notice, and procured him patronage. He removed to Rome, where he established his reputation. In 1647, when the revolt under Masaniello occurred, he joined *La Compagnia della Morté*, which Falcone commanded, and on the defeat of the cause he returned to Rome, where he was not, however, permitted to remain. He went to Florence, where he was patronized and employed by the grand duke and other members of the family of Medici. At length, returning to Rome on the death of his enemies, he painted many pictures for the churches in that city. His great ambition was to be a famous historical painter, but he is actually best known as a painter of landscapes and battles. His landscapes present wild and desolate scenery; with rocks rising like towers, broken, splintered tree trunks waving their leafless arms; storm and lightning convulse the heavens, and the figures introduced are those of bandits, soldiers, or witches. Among

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his extant works are: 'Prometheus,' 'Belisarius,' 'St. Roche Wounded,' some landscapes and battle-scenes, in Rome; 'Jesus Disputing with the Doctors,' 'Daniel in the Lions' Den,' 'Jesus Walking on the Water,' in Naples; 'Souls in Purgatory,' in Milan; 'Conspiracy of Catiline,' and his own portrait, in Florence; 'The Soldiers of Gideon,' 'Bandits in Council,' 'St. Jerome in the Desert,' and some landscapes, in Munich; 'Mercury and the Woodman,' 'Landscape with Figures,' in the National Gallery; 'Moses at the Rock,' 'Halt of the Soldiers,' at Hampton Court; 'Prometheus,' 'Sisyphus,' at The Hague; 'Regulus,' 'Cadmus,' at Copenhagen; 'The Prodigal Son,' in St. Petersburg; 'The Angel Raphael' and 'The Young Tobias,' 'The Shade of Samuel Appearing to Saul,' in the Louvre; 'Jesus in the Garden of Olives,' 'Resurrection of Christ,' in Toulouse. He was distinguished as a poet and musician and his satires and other poems have been often printed.

Rosa Americana, in numismatics, the name applied to a coinage issued in 1722 by Great Britain for America of a mixed metal resembling brass, and called Rosa Americana or Wood's money, after its manufacturer, William Wood. The royal letters patent described this money as two-pence, pence, and half-pence. See NUMISMATICS.

Rosa, Monte, mõn'tě rō'sā (ancient *Mons Sylvius*), a mountain of the Alps (q.v.), on the boundary between Italy and Switzerland, near the Matterhorn, and about 40 miles east of Mont Blanc (q.v.). It is formed by the union of several mountain ridges. Where the ridges meet four chief angles are formed, the one on the northeast, which is most precipitous, enclosing the glacier of Macugnaga, another on the northwest originating the great Gorner glacier or glacier of Zermatt, a third on the southwest containing the glacier of Lys, and the fourth on the southeast occupied by several large but less prominent glaciers. The loftiest peak, Dufourspitze, 15,217 feet in height, was first ascended in 1855. There are three other peaks, respectively 15,132, 15,005, and 14,965 feet high.

Rosaceæ, rō-zā'sē-ē, the Rose family, a natural order of herbaceous plants, shrubs, and trees, with alternate simple or compound leaves accompanied at their base by two persistent stipules. Many of our commonest edible fruits belong to this order, such as strawberries, raspberries, brambles, plums, apples, quinces, cherries, almonds, peaches. They have a calyx of one sepal, with four or five divisions, and the corolla has as many petals as the calyx has divisions, but is sometimes wanting. The stamens are generally very numerous and distinct, and are inserted with the petals round the ovary. The pistil presents various modifications. Sometimes it is formed of a single carpel or several entirely free and distinct carpels, placed in a tubular calyx. Sometimes these carpels adhere by their outer side to the calyx; sometimes they are united, not only to the calyx, but to each other; and sometimes they are collected into a kind of capitulum or head. The fruits, consequently, are highly varied, and their modifications afford the chief distinguishing marks of the sub-orders. In Engler and Prantl's 'Pflan-

zenfamilien' the *Rosaceæ* are divided into 13 tribes, and these tribes are grouped in six sub-orders. The sub-order *Spiræoideæ* comprises the tribes *Spirææ* (queen-of-the-meadow), *Quilla-jæ* (soap-tree), and *Holodisceæ*. The tribe *Pomoideæ* (apple, pear, etc.), forms a sub-order by itself. Under the sub-order *Rosoideæ* are classed the tribes *Kerrieæ* (*Kerria japonica*), *Potentilleæ* (raspberry, strawberry, etc.), *Cercocarpeæ*, *Ulmariææ*, *Sanguisorbeæ* (lady's-mantle, etc.), and *Roseæ* (roses). *Neuradoideæ*, *Prunoideæ* (sloe, etc.), and *Chrysobalanoideæ* (cocoa-plum), are tribes each of which constitutes a sub-order. The plants of this order are chiefly found in the cold and temperate climates of the northern hemisphere.

Rosaceæ, *Acne Rosaceæ*, or *Gutta Rosææ*. See ACNE.

Rosales, rō-sā'lēs, Philippines, pueblo, province of Nueva Écija, Luzón; on a tributary of the Agno River, two miles from its junction with the Agno; 38 miles north of San Isidro. It is connected by highway with Manila and with towns to the north. Pop. 11,519.

Rosamond, rōz'a-mônd, English mistress of Henry II., commonly called "Fair Rosamond." She was the daughter of Walter, Lord Clifford, became the mistress of Henry II., and died probably about 1176. The king is said to have set apart for her residence a building surrounded by a labyrinth at Woodstock. The intrigue was finally discovered by the jealous Queen Eleanor, who forced her to drink poison. These details, however, have no historic basis. She was buried in the chapter-house of Godstowe nunnery, where her tomb was long to be seen.

Rosaniline, a derivative of aniline (q.v.), the base of magenta, fuchsine (qq.v.), etc. It is a colorless substance, having the formula $C_{12}H_{11}N_3$. Many of its crystalline salts are of very brilliant colors.

Rosario, rō-sā'rē-ō, Argentina, in the province of Santa Fé, on the right bank of the Paraná, lies 160 miles northwest of Buenos Ayres. It is the second city of the republic in commercial importance, and the centre of the entire trade for the 11 provinces lying between Paraná and the Andes. Many handsome buildings are of recent construction, such as the new courts, theatre, banks, and hotels. Other improvements, such as telephone, and a new railway from the capital opening up a new and vast territory, adduce to its rapid development and progress, and it is virtually a rival of Buenos Ayres. Exports, agricultural products, were valued at more than £5,850,000. Pop. about 118,000.

Rosario, Philippines, pueblo, province of Batangas; on the southeastern coast at the mouth of the Rosario River; 13 miles northeast of 'Batangas, the provincial capital. It is an important road centre. During the last insurrection the town was destroyed by the insurgents. Pop. 12,450.

Also the name of two smaller pueblos in Luzón: (1) in the province of Cavite, on the Manila coast road, eight miles southwest of the town of Cavite, pop. 6,390; (2) in the province of Unión, situated in a mountainous district, 30

ROSARY OF THE BLESSED VIRGIN MARY — ROSCIUS

miles southeast of San Fernando, connected with coast highway; pop. 2,250.

Rosary of the Blessed Virgin Mary, a popular and highly approved form of devotion in the Roman Catholic Church. It consists in the recital of 15 decades of Aves (see AVE MARIA) each decade preceded by a Paternoster and followed by a Gloria (see DOXOLOGY): as the prayers are said, they are counted off on a string of beads. Five decades form a chaplet and in each chaplet are contemplated events or "mysteries" connected with the life of Christ: the mysteries of the first chaplet are, the Annunciation, Visitation, Birth of Christ, his Presentation in the Temple, and his Finding there: these are the Joyful Mysteries. In the other chaplets are contemplated the Five Sorrowful Mysteries — the Agony in the Garden, Scourging, etc.; and finally the Five Glorious Mysteries — Resurrection, Ascension, etc. The Rosary of 15 decades was introduced by St. Dominic in the 13th century.

Rosary Sunday, the first Sunday in October; a feast instituted by Gregory XIII. for the Confraternity of the Rosary, and made of universal observance after the victory of the Emperor Charles VI. over the Turks at Lepanto in 1571, in gratitude to the Blessed Virgin. This victory is supposed to be in answer to the prayers of the Fraternity of the Rosary, a Roman Catholic order established in the 15th century for the purpose of averting public calamity by the means of prayers. An impetus was also given to the devotion of the rosary by Leo XIII., who enjoined its daily use in public during October. Roses are blessed and distributed as souvenirs, and the rosary is recited continually during the day.

Rosas, Juan Manuel de, hoo-än' mā-noo-ël-dā rō'sās, Argentine dictator: b. Buenos Ayres 30 March 1793; d. near Southampton, England, 14 March 1877. He was descended from a noble family of Spain and first came into public notice as leader of the republicans against the aristocratic party of the Unitarios. He was commander of the police of Buenos Ayres in 1826, but the revolution headed by Lavalle forced him to retire. He succeeded a little later in overcoming Lavalle and becoming governor, 1829-32. Though forced out of office he held control of the army and in 1835 became dictator for five years. His appointment was twice renewed and until 1852 no meetings were held of the national congress or the constituent assembly. Rosas exercised a despotic rule and attempted to annex the neighboring states by force under the pretext of their formerly belonging to the vice-royalty of Buenos Ayres. He took advantage of the rivalry of Oribe and Rivera to intervene in the affairs of Uruguay, made an unsuccessful invasion in 1839 after the fall of Oribe's government and repeated the attack in 1843. A long siege followed and the closing of the Paraná to navigation, and the violation of the treaties of 1828 and 1840 finally led to combined interference on the part of England and France. Buenos Ayres was blockaded, but little was effected save the opening of the Paraná, as the river provinces could not be induced to rise against Rosas. England withdrew in July 1848 and France six months

later. The opposition party against Rosas was growing more powerful, however, and the treaty of 1849 which denied to the neighboring provinces navigation privileges of the Plate, the Uruguay, and the Paraná finally brought to his opponents the support of Brazil, and Rosas was defeated at Monte Caseros, 3 Feb. 1852. He made his escape to England, where he lived the remainder of his life. The Argentine congress passed sentence of death upon him in 1861 as "a professional murderer and robber."

Roscelin, rōs-ël-än, Rousselin, or Rucelin, Jean, French theologian of the 11th century: b. probably in the diocese of Soissons. He was educated at Rheims, and came into public notice while canon of Compiègne by citing Anselm as supporting his view of the Trinity, which in effect conceived God as existing as an individual and consequently the Trinity as three Gods. The synod of Soissons in 1092 compelled Roscelin to recant, after receiving from Anselm a refutation and denial of Roscelin's position and claims. Continuing to teach his peculiar views he was deposed. He went to England to attack Anselm, then archbishop of Canterbury, at the opportune moment of his difference with the king, but failing in his purpose returned to France. Later he settled at Tours and entered into a controversy with Abelard, his former pupil, on the grounds taken by the latter in maintaining the unity of the Trinity. After this controversy Roscelin disappears from history. Of his writings only a letter to Abelard is extant. In the history of philosophy he is classified as a nominalist and in theology as a tritheist.

Roscher, rōsh'ēr, Wilhelm, German political economist: b. Hanover 21 Oct. 1817; d. Leipsic 4 June 1894. Following Savigny, who introduced into Germany the historical treatment of jurisprudence, Roscher broke with the theoretical economists and entered on the study of the history of economics, treating political economy less as an abstract science and more as a branch of history, and making economic fact and past development rank mere economic ideas and theories. From 1848 he was professor at Leipsic. His two great works are: 'System der Volkswirtschaft' (1854-81); and 'Geschichte der Nationalökonomik in Deutschland' (1874).

Roscius, rōsh'ī-ūs, Roman actor: b. Colonium, near Lanuvium, 134 B.C.; d. about 61 B.C. He was born a slave and early adopted the histrionic profession for his master's profit. His success on the stage was phenomenal. It is said that at one time he earned 1,000 denarii (about \$175) daily, and Pliny estimates his annual profits at 50,000,000 sesterces (about \$2,000,000). This may be exaggerated, but he was a favorite actor at a period when the Roman passion for the stage was at its height. He was easily enabled to purchase his freedom from his *peculium*, or perquisites as a slave, took the name of Quintus Roscius Gallus, and wore the emblem of equestrian rank, a gold ring, given him by Sulla. The Roman populace and nobles he moved with equal facility to tears or laughter by his irresistible histrionic power, for while he was a tragedian unparalleled in the history of the ancient Roman stage, he was also a comedian of fresh and natural humor. Cicero did not disdain to receive instructions from the great

actor, whom the first orator of Rome always spoke of in terms of affection and admiration.

Roscoe, rōs'kō, Sir Henry Enfield, English chemist: b. London 7 Jan. 1833. He was educated at University College, London, and at Heidelberg, making a special study of chemistry. He occupied the chair of chemistry at Owens College, Manchester, in 1857-87, since when he has been emeritus professor there. He was knighted in 1884, sat in Parliament for South Manchester in 1885-95, and in 1896-1902 was vice-chancellor of the University of London. He has received high honors from the universities and learned societies of England and has published: 'Investigations on the Chemical Action of Light'; 'Lessons in Elementary Chemistry' (1871); 'A Treatise on Chemistry' (1878-89); 'The Hydrocarbons and their Derivatives,' with Schorlemmer (1881-92); etc.

Roscoe, William, English biographer: b. near Liverpool 8 March 1753; d. Toxteth Park, Liverpool, 30 June 1831. At 16 he was articled to an attorney in Liverpool, and this obliging him to study Latin, he read and made himself master of the Latin classics. He next studied the Italian and French languages, and in the former became uncommonly proficient. Having finished his clerkship, he was taken into partnership by an attorney of considerable practice and carried on the whole of his business. In 1777 he published a collection of some of his earlier poems and when the question of the slave-trade came uppermost Roscoe took a warm part in favor of its abolition, and joined Clarkson in his endeavors to that end. His 'Scriptural Refutation of a Pamphlet on the Licitness of the Slave-Trade' and his 'Wrongs of Africa,' appeared in 1788; and in 1796 he brought out the work which gained him celebrity; the 'Life of Lorenzo de' Medici, called the Magnificent' (1795), since translated into Italian, French, and German. About 1797 Roscoe retired from the practice of an attorney, and entered himself as a student of Gray's Inn, with a view to the bar. He published the 'Life and Pontificate of Leo X.' in 1805, and in 1806-7 represented Liverpool in Parliament. He had previously entered into business at Liverpool as a banker, a move which eventually landed him in great pecuniary difficulties. He was the author of several political pamphlets, and the mover and supporter of several public works in Liverpool. To the botanic garden and to the Athenæum he lent much effective assistance. Consult his 'Life and Correspondence' (1833) by his son, Henry Roscoe.

Rose, rōz, Chauncey, American philanthropist: b. Wethersfield, Conn., 24 Dec. 1794; d. Terre Haute, Ind., 13 Aug. 1877. In 1825 he settled in Terre Haute as a merchant, where by his investments in land he became wealthy. He was an active promoter of railroad interests and was especially interested in the Terre Haute and Indianapolis Railroad. Though legally entitled to the fortune of his brother John he disposed of almost the entire amount of \$1,600,000 in benevolent enterprises which he knew his brother to have favored, and later founded from his own fortune the Rose Polytechnic Institute to which he left the greater share of his estate.

Rose, Frank H., English engineer and journalist: b. Lambeth, England. He was educated in the London elementary schools and in the night classes, served as an engineer's apprentice in 1872-8, and then joined the Lambeth Society of Amalgamated Engineers. He gained a considerable influence over industrial thought of the day, was almost constantly an officer in the Amalgamated Engineers, living in Liverpool and in Manchester in 1893-1903 as a district organizer, since when he has entered upon a political and journalistic career.

Rose, George ("ARTHUR SKETCHLEY"), English dramatist and novelist: b. London, England, 19 May 1817; d. there 11 Nov. 1882. He was graduated from Oxford in 1845, took orders in the Church of England in 1848, and after holding several curacies became in 1855 a Roman Catholic. He then engaged in tutoring and later devoted himself to a literary career in which he achieved a considerable success. His 'Mrs. Brown' monologues were published in 32 volumes (1866-70) and enjoyed wide popularity. His other works include: novels, 'A Match in the Dark' (1878); and 'A Marriage of Conscience' (1879); plays, 'The Dark Cloud' (1863); 'How Will They Get Out of It?' (1864); 'Money Makes the Man' (1870); and also several works of travel, 'The Great Country, or Impressions of America' (1868); 'Out for a Holiday' (1870); etc.

Rose, rō'zē, Gustav, German mineralogist, brother of Heinrich Rose (q.v.): b. Berlin 28 March 1798; d. there 15 July 1873. He studied under Berzelius at Stockholm, in 1822 became keeper of the mineralogical collection in the University of Berlin, and in 1826 was made extraordinary and in 1839 ordinary professor of mineralogy in that institution. Beside several essays in Poggendorff's 'Annalen,' he wrote 'Elemente der Krystallographie' (1833); 'Ueber das Krystallisationsystem des Quarzes' (1846); 'Das krystallochemische Mineralsystem' (1852). With Humboldt and Ehrenberg he made in 1829 a journey to northern Asia, an account of which he gave in a work entitled 'Reise nach dem Ural, dem Altai und dem kaspischen Meer' (1837-42).

Rose, Heinrich, German chemist: b. Berlin 6 Aug. 1795; d. there 27 Jan. 1864. He first devoted himself to pharmacy, studied in Berlin, in Stockholm in 1819 under Berzelius, and from there went to Kiel, where he took his degree. In 1823 he became extraordinary and in 1835 ordinary professor of chemistry at Berlin. As a practical analyst in the department of inorganic chemistry he holds a high rank, and the result of his labors can be found in his memoirs inserted in the 'Annalen' of Poggendorff. His 'Manual of Analytical Chemistry' (1829) was translated into French, English, and Swedish. In 1844 he discovered a new metal in the tantalites of Bavaria which he called niobium.

Rose, rōz, Sir Hugh, Lord STRATHEARN, English diplomatist: b. Berlin 8 March 1803; d. Paris 16 Oct. 1885. He entered the British army in 1820, was military attaché to the Turkish army in 1840, was consul-general for Syria 1841-8, as secretary to Lord Stratford de Redcliffe was *chargé d'affaires* at Constantinople in 1852-4, and was commissioner at the French

ROSE—ROSE OF JERICHO

headquarters during the Crimean war. He was sent to India in 1857 to command the Central Indian army, and virtually reconquered Central India. Though his campaign was overshadowed by that of Sir Colin Campbell, it is generally admitted that his operations were more skilful and brilliant than his chief's, on whose death he became commander-in-chief in India. He held the same post in Ireland 1865-70, was raised to the peerage in 1866, and made field-marshal in 1877.

Rose, Hugh James, English theologian: b. Little Horsted, Sussex, 1795; d. Florence 22 Dec. 1838. He was graduated from Trinity College, Cambridge, in 1817; and elected professor of divinity to the University of Durham in 1833. He was one of the leaders of the Oxford movement, and it was at his rectory, Hadleigh, Suffolk, in July 1833, that a resolution was made to publish 'Tracts for the Time.' 'He was,' says Dean Church, "the most accomplished divine and teacher in the English Church. He was really a learned man. He had the intellect and energy and literary skill to use his learning. He was a man of singularly elevated and religious character; he had something of the eye and temper of a statesman, and he was profoundly loyal to the Church." It is not too much to say that by his early death the Tractarian movement lost its balance wheel. See OXFORD MOVEMENT. Consult: Church, 'The Oxford Movement' (1891); Mozley, 'Reminiscences.'

Rose, Sir John, Canadian financier: b. Turiff, Aberdeenshire, 2 Aug. 1820; d. Caithness-shire 26 Aug. 1888. He was educated at King's College, Aberdeen, and in 1836 removed with his parents to Canada. He served as a volunteer during the rebellion of 1837, in 1842 was admitted to the bar, and soon established a large practice at Montreal. He entered Parliament as member for Montreal in 1857, and after the Union until his retirement in 1869 represented Huntingdon. He was solicitor-general in 1857, minister of public works in 1859, and in 1864 was appointed commissioner for the settlement of claims under the Oregon treaty with the United States. In 1867-9 he was minister of finance, then retired from office, went to England and engaged in banking. He represented the English government on a confidential mission to the United States which led to the treaty of Washington in 1870, and until his death was regarded as the unofficial representative of Canadian interests in England. He was created a baronet in 1872 and in 1886 became a privy-councillor.

Rose, Attar of See ATTAR.

Rose-breasted Grosbeak. See GROSBEEK.

Rose-chaffer. See GRAPE INSECT PESTS.

Rose Festival, a peculiar kind of festival which is celebrated annually on 8 June in some French villages. A similar gala-day is celebrated in Los Angeles, Cal., annually in June.

Rose-mallow. See HIBISCUS.

Rose-noble, an English gold coin of the value of \$1.65, first struck by Edward III., in 1334, and so called because it was of the same value as the noble, a money of account, and was stamped on one side with the figure of a

rose. It ceased to be coined in the reign of Henry V.

Rose, Order of the. See ORDERS, ROYAL.

Rose Polytechnic Institute, an institution of collegiate grade at Terre Haute, Ind. Its organization was begun as early as 1874, but it was not opened to students until 1883. It is governed by a board of nine members, of whom one is an alumnus elected by the alumni. The institute offers four courses, each of four years' duration. They are in mechanical engineering, electrical engineering, civil engineering and architecture, and chemistry. From the first the practical work in the institute shops has been an important feature of the curriculum. The degree of bachelor of science is conferred for the completion of any of these courses; that of master of science, two years after graduation if one year is spent in graduate study; the degrees of mechanical engineer, electrical engineer, or civil engineer are conferred upon those who have the master's degree after two years' successful professional work. The grounds and buildings of the institute are valued at \$145,000, the library contains 15,000 volumes (1910). The original endowment from the founder, Chauncey Rose, was over \$500,000, and additions to this fund have since been made; the annual income in 1910 was \$42,000. The students numbered 200, and the faculty 22.

Rose Window, a circular window, divided into compartments by mullions and tracery radiating from the centre, also called Catharine wheel and marigold window according to modifications of the design. It forms a fine feature in the church architecture of the 13th and 14th centuries, and is mostly employed in the triangular spaces of gables. In France it is much used, and, notwithstanding difficulties of construction, attained great size. Notable examples are found in the windows in the cathedrals of Amiens, Chartres, Paris, and in that of Rheims Cathedral, which is over 40 feet in diameter.

Rose-wood, the commercial name for chestnut-colored, dark-veined woods, brought chiefly from Brazil, of varying origin, but mainly the product of *Dalbergia nigra*, one of the *Leguminosæ*. It is imported, not in logs or planks, since the large heart-wood rots easily, but in segments, and is sold by weight, being valued according to its richness of color. When cut it gives out a faint rose-odor, and is fine and hard, takes a high polish, and is much in demand for cabinet making and pianos, being used solidly and in veneer, although somewhat difficult to work on account of its resinous veinings.

Rose of Jericho, or Resurrection Plant, a small, annual, cruciferous plant (*Anastatica hierochuntina*) which grows in the desert regions about the Red Sea. It bears minute white flowers succeeded by tiny pods, containing a few seeds. When the seeds are ripe, the leaves fall off, the branches curl inward and interlace, enclosing the pods still holding their seeds, and become dry and rigid, causing the plant to assume the form of a ball, ready to be blown hither and thither by the winds of the dry season. When the plant is deposited in a damp place, it exercises its remarkable hygroscopic powers, rapidly uncoils, and lets the seed escape

ROSE OF LIMA — ROSEBURG

in soil suitable for germination. This habit of curling up when dry, and rapid absorption of water, forcing the apparently dead limbs to spread open, as if alive again, has caused the plant to be collected and sold as a curiosity.

Rose of Lima, Saint, a religious woman of Spanish America: b. Lima, Peru, 1586; d. there 24 Aug. 1617. Her baptismal name was Isabel, but from her fine complexion she was given the name of Rose. She early showed herself resolute in avoiding the self-indulgence of society and the world. As a symbol of the life she had chosen she planted her garden only with bitter herbs and interspersed them with figures of the cross. In her religious exercises she took the great mystic, Catharine of Siena, as her model. When her parents fell into poverty she was taken into the family of the treasurer Gonsalvo, by the devout wife of that gentleman, and by her labor day and night supplied the necessities of her parents. When she was importuned by her friends to marry, she refused, and as her duty to her parents forbade her taking the veil, she emphasized her refusal by joining the Third Order of Saint Dominick, and the religious strictness and exalted piety of her life was an example which won the admiration, sometimes the imitation, of the worldly and profane. On her death the chapter of the cathedral, the senate, and all the most honorable companies of the city took turns in carrying her body to the grave. She was canonized by Clement X. in 1671 and 30 August was appointed for her festival.

Rose of Lippe, The. See ORDERS, ROYAL.

Rose of Sharon, a name given to an ornamental malvaceous shrub, the *Hibiscus syriacus*. But the rose of Sharon of the Bible was doubtless a bulbous plant, probably a kind of narcissus. See *HIBISCUS*.

Ro'seate Spoonbill. See SPOONBILL.

Roseate Tern. See TERN.

Rosebery, rōz'bēr-i, Archibald Philip Primrose, EARL OF, English statesman and author: b. London 7 May 1847. He was educated at Eton and Oxford; became Earl of Rosebery in 1868; as a member of the House of Lords entered his political career without the advantage of a training in the Commons, but soon proved himself a brilliant debater; in 1872 was a commissioner on Scottish endowments; and was successively rector of the great Scottish universities of Aberdeen (1878-81) and Edinburgh (1882-3). From August 1881 to June 1883 he was under-secretary of state for the home department, in 1884 became first commissioner of works, and in 1886 was appointed secretary of state for foreign affairs in Gladstone's government. He was generally approved for his skilful treatment of the difficult questions connected with the war between Bulgaria and Servia, and the coercion by the European concert of Greece, then threatening war with Turkey. He was also one of the firmest supporters in the Upper House of Gladstone's first Home Rule bill. With the defeat of the bill, and of the government at the general election, he passed from office. He soon, however, entered upon a new activity, and one with which up to his time peers had been supposed to have nothing to do,—namely the municipal business of London.

Upon the organization of the London county council, a representative body, chosen by popular suffrage and responsible to the public, he at once enlisted himself in the service of the improved system of government promised thereby, on 17 Jan. 1888 became a member of the council, and on 12 February was made its chairman. In June 1890 he resigned. Following his example, many others of rank and prominence entered the council, whose work was raised to an important position in English public life. For some months in 1892 he was again president of the council. Upon Gladstone's accession to power in that year, he once more became secretary for foreign affairs. He maintained a strong advocacy of Imperial federation; made in September 1894 a notable and characteristic speech before the Lords on the Home Rule bill, which, though passed by the Commons, was thrown out by the Upper House after a four-days' discussion; and brought to a satisfactory end the serious coal strike of 1893. When Gladstone finally retired from political life in 1894, Rosebery was summoned to form an administration, notwithstanding that there were other Liberals whose length of service was thought by many to give them precedence. Many influential Liberals objected, too, it was said to a prime minister without the House of Commons. No remarkable events attended his administration. The Liberal majority was not large; and before long there were evidences of an increasing division within the party, due in large measure to opposition to his supposed imperialistic views. His government was once or twice discomfited, and finally on 21 Jan. 1895 was defeated in the committee on army estimates. He resigned on 22 January and became the leader of the Liberal opposition. In October 1896 he resigned this position. He had made several of his finest speeches, but found himself at odds with many of his party. In May 1898 he spoke on Gladstone before the House of Lords, and in 1899 was elected lord rector, and in 1908 chancellor of Glasgow University. He is distinguished for his many and varied attainments, and as a ceremonial and commemorative orator is unequaled in England. Marked characteristics of his speeches are their literary quality, derived from a very extensive reading, and that skilful irony whose presence he has so admirably indicated in the writings of Stevenson. As an author, he is known for his 'Life of William Pitt' (1891), already becoming a sort of classic; a 'Life of Sir Robert Peel' (1899); and 'Napoleon: The Last Phase' (1900), a most careful and interesting narrative of the captivity at St. Helena, with a severe arraignment of English blunders in the treatment of the emperor. Consult the 'Life and Speeches' (1900) by Coates, a eulogy throughout; also the collection, 'Appreciations and Addresses' (1899). See GREAT BRITAIN, *History*.

Roseburg, rōz'bērg, Ore., city, county-seat of Douglas County; on the Umpqua River, and on the Southern Pacific railroad; about 200 miles south of Portland. It is the commercial and trade centre for the fertile valley of the Umpqua, in which farming, fruit-growing, stock-raising, and mining are carried on. The chief manufactures are flour, dairy products, canned

ROSECRANS — ROSENTHAL

fruits, beer, wagons and carriages. It has the Oregon State Soldiers' Home. Pop. (1910) 4,738.

Rosecrans, rō'zē-krānz, William Starke, American soldier: b. Kingston, Ohio, 6 Sept. 1819; d. near Redondo, Cal., 11 March 1898. He was graduated at West Point, entering the army as 2d lieutenant of engineers in 1842, but in 1844 returned to West Point as assistant professor of engineering. From 1847 to 1854 he superintended the repair of various harbors on the eastern coast, but resigned his commission in the last named year, and retired to private life in Cincinnati, where he became a consulting engineer and architect. He entered upon his career in the Civil War in the volunteer army, his first service being the organization of the Ohio troops. From colonel of the 23d Ohio Volunteers, he was promoted brigadier-general, U. S. V., in May 1861, and 23 June was placed in command of three brigades under McClellan in the campaign of western Virginia, where he was victor in the battles of Rich Mountain and Carnifax Ferry. He served in the Department of Western Virginia until he succeeded Gen. Pope in command of the Army of the Mississippi. After successfully defending Corinth in western Tennessee during the siege of 11 June 1862, he was put in command of that district by Gen. Grant, with headquarters at Jackson, Tenn. His memorable career as commander of the Army of the Cumberland began in October 1862, and in June 1863 he moved upon the Confederate army under Gen. Bragg, whose forces he had been holding in intrenchment during the Northern victory at Vicksburg, causing Bragg's retreat over the Cumberland Mountains to Chattanooga. In the battle of Chickamauga, 19-20 Sept. 1863, Rosecrans was badly defeated. He was soon after transferred to the Department of the Missouri, and in 1864 relieved of his command. He retired to Cincinnati, where he remained until 1868, when he was appointed minister to Mexico. In 1865 he was brevetted major-general in the United States army. In 1881-5 he represented California in Congress. From 1885 to 1893 he was register of the United States Treasury, and his beautiful signature is to be seen on the treasury notes of that period. He was restored to the rank of brigadier-general and placed on the retired list of army officers in 1898.

Rose'fish, a large red fish (*Sebastes marinus*) of the rockfish family (*Scorpenidae*), taken numerous on far northern coasts, where it frequents shallow shore-waters, while southward it remains at considerable depths. It bites readily to hand or trawl lines, its flesh is good and it is profitable for market as it reaches a length of two feet. Its color is orange-red. Many local names belong to it, as red perch, snapper, Norway haddock, hemdurgan, etc. The rosefish feeds upon crustaceans, small fish, and mollusks; and the young, at least, are among the most important food-resources of cod and halibut.

Rose'mary, a shrubby, strongly aromatic plant (*Rosmarinus officinalis*), growing wild in the southern parts of Europe and also cultivated. It belongs to the Mint family (*Labiatae*) and has axillary, pale blue flowers with two stamens.

The stem is three or four feet high, bearing opposite, linear and sessile leaves with revolute margins which are dark-green, smooth and shining above, white and cottony beneath. Rosemary is tonic and slightly stimulant, and formerly enjoyed considerable repute as a medicine. It yields, by distillation, a light pale essential oil of great fragrance, which is used in hair pomades. The herb is also used for seasoning in Italy. Rosemary is often referred to in folk-lore: it was supposed to restore youth when eaten; it was woven into brides' wreaths, and otherwise employed at weddings, and was carried to funerals and thrown on the graves, because, as it did not soon fade, it was a symbol of remembrance. "There's rosemary, that's for remembrance."

Rosenau, rō'zē-now, William, American rabbi and educator: b. Wollstein, Germany. After coming to America he studied in the public schools of Philadelphia and Cincinnati and was graduated from the Hebrew Union College in Cincinnati in 1889. He was rabbi in Omaha, Neb., 1889-92, and has been rabbi in Baltimore since 1892. He has been instructor and is now associate in rabbinica at Johns Hopkins University and among his publications are: 'Semitic Studies in American Colleges'; 'Hebraism in the Authorized Version of the Bible'; 'Jewish Ceremonial Institutions and Customs.'

Rosendale, rō'zēn-dāl, N. Y., village in Ulster County; on the Rondout River, the Delaware & Hudson Canal, and the Walkill Valley Railroad; about eight miles south by west of Kingston (q.v.). It is noted for its manufacture of hydraulic cement (q.v.). Most of the cement derived from the natural cement rock, in the United States, comes from Rosendale. Pop. (1910) 1,125.

Rosenfeld, rō'zēn-fēlt, Sydney, American dramatist: b. Richmond, Va., 26 Oct. 1855. Educated in the public schools of Richmond and New York, he early displayed a fondness for literature and play-writing, and some of his dramas have won fair success. Among the plays of which he is author in whole or in part are: 'The Senator'; 'A Possible Case'; 'A House of Cards'; 'The Passing Show'; 'Lady or Tiger.' He has also adapted 'The Black Hussar'; 'Nanon'; 'Prince Methusalem'; etc.

Rosenthal, rō'zēn-tāl, Max, American artist: b. Turck, Russian Poland, 28 Nov. 1833. At 14 he studied art in Paris, and coming to Philadelphia in 1849, he entered the Academy of Fine Arts, chromo-lithography being his specialty. In 1861 he followed the Army of the Potomac and executed drawings of every camp until Gettysburg. Some of his best work is seen in illustrated plates of the report of the United States Military Commission to the Crimea (1860) and in Dickinson's 'Numismatics of the United States.'

Rosenthal, Toby Edward, American painter: b. New Haven, Conn., 15 March 1848. He studied at Munich in the studio of K. Raupp (q.v.) and in 1868 came under the instruction of Piloty. After producing many genre pictures he attracted attention by his 'Sebastian Bach and his Family at their Morning Devotions' (1870), which was purchased by the Leipsic Museum. After a visit to his home in the United States he returned to Munich and painted 'Elaine the Fair' (1874) from Tennyson's idyll

ROSEOLA — ROSES

of 'Elaine.' He also produced some humorous pictures, such as 'He Laughs Best Who Laughs Last' (two panels); and 'The Girls' Boarding School in Alarm' (1877). His name will be perhaps best remembered for his 'Trial of the Escaped Nun, Constance de Beverley' (from Sir Walter Scott's 'Marmion'); and 'A Dancing Lesson in the Time of the Empire.'

Roseola, any rose-colored rash occurring, usually in a symptomatic character, with some febrile disorder, as measles, scarlet fever, etc., or with gastric disturbances. The term is often applied, though inexact, to German measles and to mild forms of other diseases attended with a rash of similar appearance to that seen in roseola.

Roses, flowers of the type-genus *Rosa*, of the order *Rosaceæ*. The species are exceedingly variable; probably no other genus calling forth so wide a range of botanical opinion. Most botanists recognize about 100 species; Bentham and Hooker estimate the number at less than 40; but Gandoger describes more than 4,000 as indigenous to Europe and western Asia. The number of horticultural varieties, crosses and hybrids is probably several times larger than in any other genus; more than 3,000 varieties are listed in French catalogues, and since new ones are added annually the list consists of active members. The roses are widely distributed in the temperate and cold parts of the northern hemisphere extending in the respective continents southward to India, Abyssinia and northern Mexico. They are erect, climbing or trailing shrubs, generally prickly-stemmed; bear alternate, odd-pinnate, though sometimes simple, leaves and generally large, showy, pink, white, yellow or purple flowers borne either singly or in terminal corymbs, followed by generally showy berry-like fruits (hips) which contain several bony akenes. Probably no flower has played so important a rôle in the garden and in literature. It was prized in the cradle days of the Aryan race and is frequently mentioned in the writings prior to our era. China and Japan, however, seem to have been less attracted to it than more western races. In very early times the flowers exhibited their characteristic tendency to double; indeed, it is probably the first flower cultivated in this state, and is now more often thought of in this form perhaps than in its natural single form. The single roses are, however, useful and popular in park planting.

Except for ornamental purposes roses are of small importance; the only uses made of them are the preserving of the fruits of a few species for food and the manufacture of perfumes, especially attar or otto of roses and rose water from the flowers of some other kinds, principally *R. alba* and *R. damascena*, which are extensively grown in southeastern Europe, particularly Bulgaria and adjacent Asia and in southern France, in which last country the leading rose is the Provence, a hybrid variety of *R. centifolia*. The flowers are either put in stills or are macerated. In the distilling process the essential oil is extracted by steam and condensed. In each process there is considerable perfume in the water used and in the maceration process, which is most popular in France, this "rose water" is the product sought rather than the attar which is regarded as a by-product. These

perfumes are among the most important of the world, and it is said that the importations of the attar alone into the United States is greater than the importations of any citrus perfume such as lemon oil, oil of bergamot, etc.

Unquestionably the roses are the most important flowers cultivated. They are prized by every one who cares for flowers at all and throughout the civilized world are probably grown in more gardens than any other flowers. How important they are commercially appears by the statistics quoted in the article *FLORICULTURE* (q.v.). In the United States alone the number of blossoms annually grown for sale has been estimated at 100,000,000, valued at about \$6,000,000. Yet the development of this industry, which now demands the greatest skill of specialists, has sprung from insignificance in 1870; and in 1850 it did not exist.

From the botanist's standpoint the classification of Crépin in his 'Primitiæ Monographiæ Rosarum,' seems to be one of the most satisfactory and is followed by botanists perhaps more frequently than perhaps any other; from the gardener's standpoint Barron in the 'Cyclopedia of American Horticulture,' divides the roses into 19 groups with more or less subdivision. Among these the following are probably the most important. *Provence*, perhaps most familiar in America in one of its types, the fragrant globular flowered moss roses; *Damask* and *French*, fragrant-flowered, robust growing, hardy prolific roses; *Ayrshire*, very hardy climbing roses with solitary fragrant white to deep crimson flowers; *Briers*, small perishable-flowered garden roses more useful in shrubberies than for cut flowers; *Multiflora*, with large corymbs of rather short lived flowers, and popularly known as ramblers, used largely in wild gardens, though the crimson Rambler and its sub-varieties which belong to the polyantha subdivision are used for porch decoration for which they are admirably adapted; *Evergreen*, the foliage continuing very late in autumn; for example, *R. Wichuriana*, a very popular hardy trailer which grows anywhere; *Hybrid perpetual*, upright growing, though sometimes pendulous, shrubs which bear flowers of all types and colors and embrace the largest number of varieties of any group but so greatly mixed as to preclude separation and definition; *Hybrid teas*, a group of the preceding, the members being the result of crosses with the Chinese tea-scented rose, especially rich in forcing varieties; *China* or *monthly rose*, a perpetual-blooming rose chiefly interesting because of its effect upon other roses by hybridizing through its variety the tea rose; *Musk*, very fragrant light colored rather tender roses best known in their derivatives, and noisettes, which blossom later, are hardier than the type, and will grow in any soil but are little used probably because the blending with the teas seems to have impaired their hardiness; *Polyantha*, perpetual-flowering multiflora climbing varieties bearing small flowers in clusters and especially promising as the parents of a nebulous group of varieties adapted to American requirements; *Perpetual briers*, best known in America by one of its component species *R. rugosa*, a hardy Japanese rose much used in exposed situations for hedges, screens, etc., and useful for hybridizing with many other species.



A LA FRANCE ROSE.

ROSES

Rose species are propagated by seeds which are either sown as soon as the hips are ripe or are stratified in sand until spring. If allowed to become dry they may require two years to germinate, but if treated as above they generally sprout the first spring. Many species may be propagated by means of cuttings of nearly mature wood taken during summer and rooted under glass. Others will grow from mature wood cuttings taken in autumn and rooted in the spring like currants and gooseberries. Layering is generally practised with such species as do not root readily from cuttings; for example, *R. hemispharica* and *R. eglanteria*. Some species such as the cinnamon rose (*R. cinnamomea*), the Carolina rose (*R. carolina*) and the Damask rose (*R. damascena*), may be propagated by suckers, division or by cuttings of the roots which in the last case should be dug in autumn, stored in sand or sphagnum in a frost-proof cellar until spring when they are planted in nursery rows. Grafting and budding are also practised, but are frequently unsatisfactory where regular intelligent attention cannot be given to the removal of the suckers that generally spring from the stock. For greenhouses and for forcing cuttings of semi-mature wood are nearly universally used. They may be taken at any time, rooted with bottom heat in sand, and kept in pots until large enough to be transplanted upon the branches.

In general, roses thrive best upon loamy soils, rich in plant food and humus, well drained but moist, in situations sheltered from the wind but where they will receive the sunlight at least half the day. They do not generally succeed upon very loose or sandy soils, but often do upon heavy clays. They are seldom difficult to transplant with ordinary care, are easy to cultivate and generally simple to prune. The removal of weak and old wood is the most important pruning detail. But care must be taken especially with climbing varieties to preserve the long sturdy shoots, since they are most prolific of blossoms. Indoor roses cultivated for cut flowers are generally pruned so as to have the flowers borne singly at the ends of long stems sometimes, as in the case of American Beauty, exceeding 4 feet in length. But this is a special florist's practice and is dependent not only upon the method of pruning but upon the management of the plants otherwise. In the garden the plants may usually be set about 30 inches apart in beds about four feet wide, the plants of one row being preferably opposite the intervals of the other so as to obtain full light and air. Beds of this width need not be tramped on when the flowers are being gathered. Cultivation consists in keeping the surface loose and open at all times by raking, a rather shallow forking being given each spring. In the autumn a liberal mulch of stable manure should be spread upon the beds and the coarser parts removed in the spring before the annual forking. The removal of all dead, failing or puny shoots should precede the cultural operations. Many gardeners give applications of liquid manure just as the flower buds appear and preferably preceding a shower. When well managed a rose bed should be satisfactory for ten or more years.

A large number of insects feed upon the rose both out of doors and in the greenhouse.

Of those which sometimes prove troublesome in the garden the rose beetle or chafer is perhaps the most annoying, since it feeds upon the petals of the opening flowers, thus ruining them. The only remedy which has been satisfactorily applied is hand picking. Plant lice (see *APHIS*) and scale insects (q.v.) are often found upon roses, but in the garden are not usually very troublesome. Slugs occasionally skeletonize the leaves by working upon the undersides and several caterpillars, beetles, etc., also live upon the foliage, usually, however, in insufficient numbers to do damage. In the greenhouse some of the above species may appear, but they are usually debarred by correct methods of management, especially as to ventilation, temperature and humidity. The red spider, not an insect but a mite, is sometimes troublesome where the air is allowed to become too dry. Management will also prevent the so-called plant diseases occasionally found in poorly ventilated houses; indeed, attention to the details mentioned is in many leading houses found more expedient and satisfactory than recourse to the so-called remedies for either insects or maladies.

Bibliography.—Buist, 'The Rose Manual' (Philadelphia 1844, etc.); Prince, 'Manual of Roses' (New York 1846); Parsons, 'The Rose' (New York 1847, etc.); Parkman, 'Book of Roses' (Boston 1866); Shaw, 'The Rose' (St. Louis 1882); Ellwanger, 'The Rose' (New York 1882, 2d ed. 1892, New York); Hatton, 'Secrets of Rose Culture' (Huntington, N. Y., 1891); Vergara, 'Bibliografía de la Rosa' (Madrid 1892).

M. G. KAINS,
Cropp Expert.

Roses, Wars of the, the name given to the protracted struggle between the houses of Lancaster and York for possession of the English throne, in the second half of the 15th century. The appellation was derived from the badges adopted by the contending parties, a white rose by York and a red rose by Lancaster. The outbreak of the war was brought about by the growing discontent of the people with the evil fortunes of the war against France and the oppressive taxes necessitated by the heavy military expenditures. The imbecile Henry VI. (q.v.) had shown himself quite incapable of the tasks of government and this served to enhance the power of Richard, Duke of York, the representative of the claims of the house which had been driven from the throne in 1399 in the person of Richard II. The Duke of York's great opponent was Margaret, wife of Henry VI., a woman of great strength of character and much ability. The first battle of the war was fought in 1455 at St. Albans and resulted in a victory for the Yorkists whose head became, for the second time, protector of the realm. War broke out again in 1459 and began auspiciously for the Lancastrians. The Duke of York and the Earl of Warwick and Salisbury were compelled to flee the country. In June 1460, they returned, however, and defeated the Lancastrian forces at Northampton and took Henry VI. prisoner. A compromise was effected by which Henry VI. was to retain the crown until his death, when it was to pass to the Duke of York. Queen Margaret, however, would not consent to this wrong to her son, and continued the struggle. At Wakefield 30 Dec. 1460, the Yorkists were defeated and the Duke of York was killed and

soon after the Lancastrians gained a second victory at St. Albans. Edward, Earl of March, the Duke of York's eldest son, joining forces with Warwick succeeded in getting possession of London, which was a fervent supporter of the Yorkist cause, and was elected king, setting out immediately to meet the enemy on whom he inflicted a bloody defeat at Towton (29 March 1461). Henry VI. fled to Scotland and the remnants of Lancastrian resistance were crushed out at Hedgley Moor and Hexam in 1464. A quarrel between Edward IV. and the Earl of Warwick led the latter to embrace the Lancastrian cause. Returning from France with a large force in 1470 he compelled Edward to seek refuge in Holland. Henry VI. was released from captivity and replaced upon the throne. Edward IV., however, returned to England in the early part of 1471 and on 14 April decisively defeated Warwick at Barnet, the "king-maker" himself falling in the fight. On 4 May a Lancastrian force under Queen Margaret was overthrown at Tewkesbury and the young Prince Edward met his death there, most probably by assassination after the battle. Henry VI. died in the Tower a few days later and Edward IV. was securely established on the throne. The last battle in the long conflict was fought in 1485 when Henry of Richmond, representative of the Lancastrian claims, overthrew Richard III. (q.v.) at Bosworth Field and ascended the throne as Henry VII. By his marriage to Elizabeth, the daughter of Edward IV., he united in himself the claims of the rival houses. See ENGLAND, *Civil History*. Consult: Gairdner, 'Lancaster and York' (1886).

Rosetta, rō-zēt'ta (Ar. RESHID), Egypt, a city near the mouth of the Rosetta Canal,—a branch of the Nile,—formerly the medium of communication between Cairo and Alexandria, which gave to Rosetta a commercial importance which it has lost by the opening up of other channels of traffic. From 1798 to 1807 Rosetta was captured in turn by the French, English, and Turks. Pop. 13,500.

Rosetta Stone, a slab of black basalt of ancient Egypt, now in the British Museum, chiefly noted as having furnished the key for the decipherment of the Egyptian hieroglyphics. The stone was discovered in 1799, during the excavation of Fort St. Julien, near Rosetta, Egypt, by M. Boussard, an officer of engineers in the French army of occupation. Three years later the stone was brought to England and deposited in the Museum. The stone was erected in 195 B.C. by the priests of Egypt in honor of Ptolemy Epiphanes and in commemoration of his remission of the dues of the sacerdotal body (q.v.). It bears an inscription duplicated in three languages, in Greek, in hieroglyphics or sacred, in demotic or common characters, and this fact enabled Dr. Thomas Young in 1818 and later, M. Champollion, in 1822, to decipher it in the three languages and thus furnish a key for the reading of the hieroglyphics (q.v.). The Rosetta Stone is 3½ feet long, 2½ feet wide, and nearly a foot thick. See ARCHÆOLOGY; HIEROGLYPHICS.

Rosetta Wood, an East Indian wood, of unknown origin, reddish orange in color, with darker veinings. The wood is close, hard and very beautiful when first cut, but soon becomes darker by exposure. It is used in fine cabinet work, and is imported in logs.

Rosewater, Andrew, American civil and sanitary engineer: b. Bohemia 31 Oct. 1848. After a course of study in the common and high schools of Cleveland, Ohio, he became flagman in the engineer corps of the Union Pacific Railroad, engaging in explorations and surveys in 1864 and later in other engineering positions on the same road. He was assistant city engineer of Omaha, Neb., 1868-70 and city engineer 1870-5. He was in charge of the construction of the Omaha and Northwestern Railroad 1878-80; was resident engineer of the Omaha Water Works Company, 1880-1, and from 1881-7 was city engineer. Between 1887 and '91 he was consulting and designing engineer of sewerage for 25 cities. Since 1897 he has been city engineer of Omaha and president of its board of public works.

Rosewater, Edward, American journalist b. Bukovan, Bohemia, 1841; d. Omaha, Neb., 31 Aug. 1906. Coming to America in 1854, he became a telegraph operator and for two years (1861-3) was in the United States military telegraph corps. In 1863 he went to Omaha, Neb., as manager of the Pacific Telegraph. In 1871 he was elected to the Nebraska Legislature. In 1871 he founded the *Omaha Bee*, and edited it till his death. He was vice-president of the Universal Postal Congress at Washington, 1897, and the original founder of the Omaha Trans-Mississippi Exposition (1898).

Rosicrucians, rō-zī-kroo'shī-anz, a real or imaginary secret society, the alleged existence of which became known unexpectedly at the beginning of the 17th century. Early in that century appeared several books concerning the society, which are now generally ascribed to Johann Valentin Andrea, a Lutheran clergyman, and among which is the 'Fama Fraternitatis R.C.' (1614). This work is the story of a certain holy and reverend Brother Christian Rosenkreuz, a German noble of the 14th century, who, inspired with the lofty ambition of reforming the world, spent a large portion of his days among the Brahmans, and in Jerusalem, Damascus, Egypt, Morocco, Fez, etc., in the pursuit of wisdom. Returning to Germany he founded an order, consisting of but few members, who met in a house erected by himself, and called Sancti Spiritus Domus, where he died at the age of 106. His burial-place was to be kept a secret by all the adepts, but he ordered the words "Post CXX annos patebo" to be inscribed upon one of the doors of the house of the order. To this work was added another, 'Confession of the Society and Brotherhood of the Rosy Cross,' addressed to the learned of Europe. This tract declared that the order had no intention of interfering with the religious or political action of states, but only desired the improvement of mankind by the discovery of the true philosophy. Whether such a society ever existed is still an open question. Many will have us believe that the above treatises were meant by Andrea to satirize in serio-comic style the philosophical follies of the age, having no expectation of them being regarded otherwise than as fiction. The fraternity had fallen out of public attention for a long time, when in the latter half of the 18th century the interest in their organization was revived, especially by the noted impostor Cagliostro, who gave out that he was a Rosicrucian.

Ros'in, or Resin, the name given to the resin of coniferous trees employed in a solid state for ordinary purposes. It is obtained from turpentine by distillation. In the process the oil of the turpentine comes over and the rosin remains behind. There are several varieties of rosin, varying in color from the palest amber to nearly black, and from translucent to opaque. It differs somewhat according to the turpentine from which it is derived, this being obtained from numerous species of pine and fir. It is used in the manufacture of sealing-wax, varnish, cement, soap, for soldering, etc. Colophony is a name for the common varieties. See **NAVAL STORES**.

Rosmini, rös-mē'nē, Antonio Rosmini-Serbati, Italian philosopher: b. Roveredo in the Italian Tyrol, 25 March 1797; d. Stresa, July 1855. He began the course of studies for the priesthood at Padua in 1817, and was ordained in 1821. He became deeply versed in philosophy, ancient and modern, and revolved in his mind a comprehensive system to serve as a basis for the truths of revelation, while on the practical side he planned an institution for the training of teachers and priests. From 1826 to 1828 he lived mostly in Milan, thought out the rule of his new order, visited Rome, gained the approval of Pius VIII. both for special studies and for the institution of his order, and published his 'New Essay on the Origin of Ideas' (1830).

After a few years of labor at Trent he settled in 1837 at Stresa on the west shore of Lago Maggiore and, surrounded by loving and devoted friends, sent volume after volume to the press. His dream in politics, as expressed in his 'Constitution according to Social Justice' (1848), was a confederation of the states of Italy under the Pope as perpetual president. For a brief period he basked in the papal favor, and was promised by Pius IX. a cardinal's hat; and on the Pope's flight to Gaeta, he followed, but now found the pontiff's mind turned against him and never afterward regained his confidence. His 'Constitution' and 'The Five Wounds of Holy Church' were next prohibited by an irregular meeting of the Congregation of the Index called at Naples. But in 1854 the Congregation of the Index, the Pope presiding, declared Rosmini's writings entirely free from censure, and enjoined perpetual silence on all his accusers. The 'Institute of the Brethren of Charity' survived its founder, and among the Rosminian Fathers, who are mostly Italians or Englishmen, are to be found at the present day some of the ablest and most devoted sons of the Roman Church. In England it has foundations at Ratcliffe, Loughborough, Cardiff, Wadhurst, Rugby, and established in 1876 its central house at St. Ethelreda's, Holborn, once the domestic chapel of the palace of the bishops of Ely.

The foundation of Rosmini's philosophy is being considered as the form of the intelligence — an elemental intuition of which is implanted by Nature herself. Intuition gives us ideas, of which we may affirm (1) that they are not nothing; (2) that they are not ourselves; (3) that they have a mode of existence of their own, entirely different from that of real or subsistent things, and independent of the bodily sense. Their two essential characteristics are universality and necessity; for real objects and sensations are always particular, instead of being

universal and generic, and every object which involves no contradiction is necessarily possible. These two characteristics involve two others, infinity and eternity; the origin of the ideas comes from God, for man does not receive them from the things themselves. The one indeterminate and wholly universal idea is that of being or existence; we cannot determine the subsistence of an object until we first have the idea of it, therefore perception involves the idea which is further isolated from all the other elements of the perception by the process of universalization, through which it may be realized an indefinite number of times. When the ideas are all fully or perfectly determined, they are called concrete; when they remain to a certain extent indeterminate, they are abstract. Being is incorporeal, independent of space, spiritual, and therefore incorruptible and immortal. It is independent of time; as being in its essence is always being, and as it would be a contradiction in terms for being to cease to be being, it is eternal. But since it was united to the soul in time, it must have existed before it and be independent of it. And thus we reach an Intelligence anterior to human intelligence — an Eternal Mind. This eternal mind is God's, and therefore God exists, and His existence and the immortality of the soul remain the true foundation of morals. Consult: Tommaseo, 'Antonio Rosmini' (1855); Lockhart, 'Life of Antonio Rosmini' (1866); Werner, 'Rosmini und seine Schule' (1884); and, above all, Thomas Davidson, 'Philosophical System of Rosmini' (1882).

Ross, rös, Alexander, British soldier: b. Scotland 1742; d. London 29 Nov. 1827. He entered the British army in 1760, and was made captain in 1775. He served as aide-de-camp to Lord Cornwallis in the war of the American Revolution, and arranged for his surrender at Yorktown. He afterward served with Cornwallis in India, and in 1812 attained the rank of general.

Ross, Alexander, Canadian fur trader and author: b. Mairnshire, Scotland, 9 May 1783; d. Manitoba 23 Oct. 1856. He emigrated to Upper Canada in 1805 where he was for some years a teacher. In 1810 he joined the fur-trading expedition of John Jacob Astor and established trading posts in the most isolated regions. He wrote the earliest and most graphic accounts of the Columbia and Oregon country, with the opening up of which he was for years identified. He also had a prominent part in the colonization of Manitoba. Among his works are: 'Adventures of the First Settlers on the Oregon and Columbia Rivers' (1849); 'Fur Hunters of the Far West' (1855); and 'Red River Settlement: Its Rise, Progress and Present State' (1856).

Ross, Alexander Milton, Canadian naturalist: b. Belleville, Ontario, 13 Dec. 1832; d. Detroit, Mich., 27 Oct. 1897. At 13 he came to New York, where he became a compositor on the *Evening Post* and a protégé of William Cullen Bryant. In 1851 he began to study medicine, and during the Civil War was a surgeon in the Union army, but rendered his greatest service to the cause as confidential correspondent to Lincoln in Canada. His subsequent life was chiefly devoted to the study of natural history, in the pursuit of which he has added valuable in-

formation concerning the fauna and flora of Canada. He published: 'Birds of Canada' (1872); 'Butterflies and Moths of Canada' (1873); 'Forest Trees of Canada' (1874); 'Ferns and Wild Flowers of Canada' (1877); 'Mammals, Reptiles and Fresh Water Fishes of Canada' (1878).

Ross, Clinton, American novelist: b. Binghamton, N. Y., 31 July 1861. He was graduated from Yale in 1884, and began his career in newspaper work in New York. He is the author of: 'The Silent Workman' (1886); 'The Speculator' (1888); 'The Adventures of Three Worthies' (1891); 'Improbable Tales' (1892); 'A Trooper of the Empress' (1898); 'Heroes of Our War with Spain' (1898); 'The Tale of Many Gods' (1903); etc.

Ross, George, American patriot: b. New-castle, Del., 1730; d. Lancaster, Pa., July 1779. On his admission to the bar in 1751 he settled in Lancaster, Pa. As a member of the Pennsylvania assembly 1768-70, he drew up the declaration of rights which was presented by the assembly to the proprietary government. He was a member of the Continental Congress from 1774-7, and as such was one of the signers of the Declaration of Independence. In 1779, three months before his death, he was made judge of the admiralty court of Pennsylvania.

Ross, Sir James Clark, English explorer: b. London 15 April 1800; d. Aylesbury, Buckinghamshire, 3 April 1862. He was a nephew of Sir John Ross (q.v.) whom he accompanied on the voyage in search of a northwest passage in 1818. Between 1819 and 1827 he accompanied Captain Parry upon his four Arctic explorations, and was a member of the expedition of his uncle in 1829-33. His discovery of the north magnetic pole in 1831 raised him to the rank of post-captain; but it was in his memorable voyage to the Antarctic Ocean in 1839-43 that he rendered his most valuable contribution to science. He succeeded in reaching lat. 78° 10', and discovered a great ice-bordered continent which he named Victoria Land, and an active volcano which was called Mount Erebus after the discoverer's ship. For these services he was knighted in 1844. In 1848 he was a member of the party which made an unsuccessful attempt to discover the fate of Sir John Franklin. He became rear-admiral in 1851. An account of his Antarctic expedition was published by him in 1847, entitled 'A Voyage of Discovery and Research in the Southern and Antarctic Regions.' Consult: O'Byrne's *Naval Biographical Dictionary*; Markham, 'Fifty Years' Work of the Royal Geographical Society.'

Ross, Janet Anne Gordon, English author: b. London 24 Feb. 1842. She was married to H. J. Ross, a banker of Alexandria, Egypt, in 1860, was for three years Egyptian correspondent of the London *Times*, and since 1867 has lived in Italy. She has published: 'Italian Sketches' (1887); 'Three Generations of Women' (1888); 'Leaves from our Tuscan Kitchen' (1899); 'Florentine Villas' (1901); etc. The two works last named have been reprinted in this country.

Ross, John, American patriot: b. Rosshire, Scotland, 29 Jan. 1726; d. Philadelphia, Pa., March 1800. After a mercantile experience

of 20 years in Perth, he emigrated to America at the beginning of the rebellion of its colonies, and became at once a staunch defender of the cause of independence. In June 1774, as chairman of the meeting of Philadelphia merchants in protest against British importations, he signed the agreement presented to the authorities and otherwise resisted unjust taxation.

Ross, Sir John, English Arctic explorer: b. Balsarroch, Scotland, 24 June 1777; d. London 30 Aug. 1856. He entered the navy at 9 and was promoted lieutenant in 1805. His first Arctic expedition was made in 1818, when, with Lieutenant Parry, he made a voyage in search of a northwest passage to the north pole. His second Arctic voyage was made in 1829 in a small vessel equipped at the expense of Sir Felix Booth, high sheriff of London, which proved inadequate for the purpose. The exploring party was frozen up in the ice for four winters, and was rescued in 1833 by Ross's old ship, the *Isabella*, in Lancaster Sound. He was knighted for his services in 1834, and made rear-admiral in 1851. In 1839 he was appointed consul at Stockholm, and served until 1845.

Ross, John, or **Kooweakooe**, Indian chief: b. Georgia 1790; d. Washington, D. C., 1 Aug. 1866. He was a Cherokee half-breed who became chief of his tribe in 1828. In 1817-19 Georgia attempted to remove the Cherokees from its borders through a bribe offered to Ross, who had received an English education and was a man of importance in his tribe. He exposed the attempt and continued to repulse the concerted effort of the people of the State to effect their removal. In 1829 Ross, as chieftain, successfully appealed to the Supreme Court of the United States against the action of the Georgia legislature in expelling his people, nevertheless the Cherokees were banished in 1838.

Ross, Jonathan, American jurist and statesman: b. Waterford, Vt., 1826; d. Saint Johnsbury, Vt., 22 Feb. 1905. He entered Dartmouth College in 1847 and was graduated in 1851. He earned his early education by working on his father's farm during the summer, and by teaching school during the winter. After graduating, he taught in Craftsbury, and was principal of the academy at Chelsea, Vt. Meanwhile he studied law, and was admitted to the Orange County bar in 1856, practising until he was elected in 1870 as assistant judge of the Supreme Court. He was elected chief judge in 1890. Judge Ross was State attorney for Caledonia County 1862-3, represented Saint Johnsbury in the legislature 1865-7, and in 1869 was a member of the last council of censors held in the State. In 1870 he represented Caledonia County in the State Senate, was for several years a member of the State board of education, and early in 1899 was appointed by Gov. Smith to succeed Justin S. Morrill in the United States Senate.

Ross, Sir William Charles, English painter: b. London 3 June 1794; d. there 20 Jan. 1860. Entering the schools of the Royal Academy (1808) he carried off five silver medals, during his career as a student, and when he was but 15 (1809) exhibited at the Royal Academy 'Mordecai Rewarded'; 'The Judgment of Solomon'; and the portraits of a mother and child as 'Venus and Cupid.' In 1821 his 'Judgment

of Brutus' gained the gold medal of the Society of Arts. His most ambitious religious picture, 'Christ Casting out the Devils from the Maniacs in the Tombs,' exhibited at the Royal Academy (1825), was the last large canvas that he executed. Henceforth he devoted himself to miniature. He was elected R.A. in 1839 and became the most fashionable painter of his time in his chosen department. He painted Queen Victoria, Prince Albert, and their children, the King and Queen of the Belgians, and was summoned to Lisbon to paint the King and Queen of Portugal. Prince Louis Napoleon, (afterward Napoleon III.) sat for him; and he also painted every personage of his day in England distinguished for rank or genius. The total number of these exquisite works, as calculated from his own memoranda, was 2,200. He wisely attempted to give to the miniature that breadth of treatment which distinguished Reynolds, whom he evidently took for his model. His drawing was invariably correct, and marked by a nameless elegance enhanced by the truthfulness and clearness of his flesh tints and his clever handling of textures. His miniatures are still considered the models of their class in England. He was an enthusiast in his profession and on his death-bed almost his last words were expressions of regret that photography would destroy the art of painting in miniature.

Roszbach, rös'bāh, or **Rosbach**, Prussia, a village of Saxony, in the government of Merseburg, 17 miles south of Halle, famous for the battle fought in its vicinity 5 Nov. 1757, when 22,000 Prussians under Frederick the Great defeated 43,000 French and Imperialist troops commanded by Soubise and the Prince of Saxe-Hildburghausen. The allies' loss was 1,700 killed and 7,000 taken prisoners, while the Prussian loss amounted to only about 500 killed.

Rosse, rös, **William Parsons**, 3D EARL OF, British astronomer: b. York 17 June 1800; d. Monkstown, Ireland, 31 Oct. 1867. He was educated at Dublin University and at Magdalen College, Oxford, where he was graduated in 1822. He was member of Parliament for King's County from 1823 to 1834, and succeeded his father in the earldom in 1841. In 1845 he was elected a representative peer of Ireland, but took little interest in politics. During the stormy discussions on the first reform bill he was occupied with the construction of his first famous reflecting telescope, the speculum of which had a diameter of three feet, and was soon superseded by one of double the size. The two great defects which had hitherto baffled opticians in constructing large reflecting mirrors were spherical aberration and absorption of light by specula, and in the casting of those of large size there arose the apparent impossibility of preventing cracking and warping of the surface on cooling. Even the proper admixture of the metals for the reflector had to be ascertained by numerous and costly experiments. At last, however, a gigantic speculum, weighing three tons, was turned out without warp or flaw and was then polished and mounted on a telescope 52 feet in length in Lord Rosse's park at Parsonstown, at a cost of \$150,000. The sphere of celestial observation was immensely widened by an instrument so powerful; nebulae which had defied Herschel's telescope were resolved into stars, and new nebulous mist was revealed to the observation. The con-

struction of the telescope, effected under the earl's direction and superintendence, is fully described in the 'Philosophical Transactions' of the Royal Society, of which body he was president 1849-54.

Rosselli, rös-sěl'lē, **Cosimo**, Italian painter: b. Florence 1439; d. there 1507. He was a pupil of Neri di Bicci, the representative of the early Florentine school, and this school furnished the guiding principles of his artistic life, which was especially influenced also by the work of Benozzo Gozzoli. The altar-pieces and frescoes which he produced were filled with figures dressed in the costumes of his day, and the realistic minuteness of his faces seems to suggest that they were portraits of his contemporaries. He was in short a genuine Pre-Raphaelite of the Florentine school. His finest work is a fresco in the chapel of Sant Ambrogio at Florence: 'The Exhibition of a Miracle-working Chalice,' — a fashionable religious function of old Florence, displaying the silks, laces and jewelry of the time in all their splendor. Among other good works of his may be mentioned: 'The Coronation of the Virgin' and an 'Assumption,' both at Florence. He was called to Rome in 1480 by Sixtus IV. and contributed to the decoration of the Sistine Chapel, with the approval of the Pope who admired his lavish use of gold and ultramarine. Among his pupils the most celebrated were Pietro di Cosimo and Fra Bartolommeo (q.v.). He produced few easel pictures, but one of these, 'The Annunciation' (1486), was sold in 1847 for \$1,627 in England.

Rosser, **Thomas Lafayette**, American soldier and civil engineer: b. Campbell County, Va., 15 Oct. 1836; d. 29 March 1910. He entered West Point from Texas in 1861, but when President Lincoln ordered that class into the field after the attack upon Fort Sumter, Rosser resigned and entered the Confederate army, in which he was appointed 1st lieutenant of artillery and later captain. In 1862 he was made lieutenant-colonel and shortly afterward colonel of the 5th Virginia regiment under J. E. B. Stuart. In 1864 he became major-general in the army of Northern Virginia. He refused to surrender at Appomattox; escaped through the Federal lines, and while trying to reorganize scattered troops was captured and made a prisoner of war. After the war he studied law, but did not practice. In 1868 he became assistant-engineer in the construction of the Pittsburg and Connellsville Railroad; engaged on the Northern Pacific in 1870, becoming the next year chief engineer of its construction through Minnesota, Dakota and Montana; in 1881 became chief engineer of the Canadian Pacific railway. In 1886 he returned to Virginia to reside, and in the war with Spain in 1898 commanded a volunteer brigade.

Rossetti, rös-sěl'tē, **Christina Georgina**, English poet, daughter of Gabriele Rossetti (q.v.): b. London 5 Dec. 1830; d. there 29 Dec. 1894. She was educated at home and her first verses were written in 1842 and printed in the private press of her grandfather, Gaetano Polidori. She was probably her brother Dante's first model and many portraits of her exist both as portraits and as figures in his paintings. A volume of her verse came from the Polidori press in 1847 and, later, after the establishment of 'The Germ' in 1850, she contributed to it.

under the name of "Ellen Alleyne." Of a deeply religious temperament, she was a devoted High Churchwoman and her writing, aside from devotional manuals and strictly religious works, was mainly poetry of a devotional character. 'Goblin Market,' however, published in 1862, is not of this type; and for original and purely imaginative qualities was never afterward approached by her. She also wrote 'The Prince's Progress' (1866); 'A Pageant' (1881); stories and nursery rhymes under the titles, 'Commonplace' (1870), and 'Sing Song' (1872); 'Verses' (1873), and such religious works as 'Annus Domini' (1874); 'Called to be Saints; the Minor Festivals' (1881); 'Time Flies: a Reading Diary' (1885); 'The Face of the Deep' (1892). From 1871 to her death she was for most of the time an invalid. Consult: Mackenzie Bell, 'Christina Rossetti: a biographical and critical study' (1898).

Rossetti, Dante Gabriel, English poet and painter: b. London, 12 May 1828; d. Berchington, 10 April 1882. His full name was Gabriel Charles Dante, but for literary purposes he rearranged it in the form by which he is now remembered. He was one of four children, all of whom, especially himself, his sister Christina and his brother William Michael, achieved fame in literature. His father, Gabriele Rossetti, professor of Italian in King's College, was an Italian exile, an enthusiastic patriot, himself a poet, and author of several critical works on Dante. He had married Frances Mary Lavinia Polidori, of English and Italian blood.

Dante Gabriel was educated at home, in an atmosphere of culture and fine enthusiasms; from his ninth to his fourteenth year he attended King's College. During that time he received some instruction in drawing, and upon leaving college he gave himself to the study of art, entering the Royal Academy in 1848. At the same time he began his translations from Dante and other Italian poets, showing from the first more genius in poetry than in painting. His great poem, perhaps his most remarkable, 'The Blessed Damozel,' was written about 1847. In 1848 he entered the studio of Ford Madox Brown, where he met Woolner, Holman Hunt, and Millais—the group that with himself and Madox Brown constituted the so-called pre-Raphaelite brotherhood. In 1850 William Michael Rossetti, edited *The Germ*, a short-lived but famous magazine devoted to pre-Raphaelite ideals; in its page appeared 'The Blessed Damozel' and other work of Dante Gabriel Rossetti's. Just what were the ideals of the pre-Raphaelites is hard to define; they stood in general for the devotional sincerity in art of those painters who preceded Raphael, and for freedom from modern academic canons; yet Rossetti himself was not strictly a pre-Raphaelite; his drawing was quite in his own style, little affected by the manner of the old painters.

For some time Rossetti had to face the proverbial artist's struggle; his pictures were not bought, and the peculiarities of his drawing were severely criticised. Ruskin's kindly defense of the pre-Raphaelites, however, encouraged the whole group. Shortly afterward Ruskin made Rossetti a standing offer to buy, up to a certain sum, all of Rossetti's painting that pleased

him. The arrangement lasted for some time, to Rossetti's great benefit. Through Ruskin he met Sir Edward Burne-Jones, who introduced him to Morris and Swinburne. Ruskin also generously assumed the cost of Rossetti's first volume, the 'Early Italian Poets,' a collection of translations which appeared in 1861. Rossetti afterward paid back the loan, and the book was reprinted in 1874 under the title of 'Dante and His Circle.'

In most of Rossetti's early pictures, his Beatrices and ideal ladies were copied after his wife, Elizabeth Eleanor Siddal, herself a poet and artist, whom he had married in 1860. Mrs. Rossetti was an invalid; the poet had no delusions as to the sadness shortly in store for him. But when, in 1862, his wife accidentally hastened her fate by an overdose of laudanum, Rossetti gave way impetuously to his grief, and in his impulsive despair buried in his wife's coffin the manuscript of his poems, for the most part inspired by her.

In the course of the next seven years—during which time he continued his painting with success, and also began the use of chloral—his friends persuaded him to recover his manuscripts, which he did in 1869. The following year appeared his 'Collected Poems,' containing the 'House of Life' sonnet sequence in its original complete form. In October 1871, Robert Buchanan, under the pen-name of 'Thomas Maitland,' wrote an essay entitled 'The Fleshly School of Poetry,' in the *Contemporary Review*. The purpose of this article was to show that Rossetti's poetry in thought and expression, was indecent; and to make his point the writer did not shrink from misquoting Rossetti or perverting his meaning. Rossetti made an adequate reply in an article called 'The Stealthy School of Criticism,' and in later editions somewhat unnecessarily withdrew the verses that had most offended Buchanan. But the injustice of the attack preyed upon him until his mind was deranged; at one time only the loving care of his friends prevented him from committing suicide.

He partly recovered his mental poise, and for a time entirely recovered his poetic and artistic faculties, which seemed at first not to be affected by his use of chloral. Several of his best pictures belong to this time; the 'Ballads and Sonnets' were published in 1881. These last years, however, were years of pitiful suffering and gradual collapse. His friends sheltered him from his worst moods and cared for him to the end.

In both painting and poetry Rossetti's personality expressed itself with unusual evenness throughout his career, and in 'The Blessed Damozel,' one of his earliest poems, almost all his qualities can be traced. Like so much of his other writing, it was illustrated, set to painting, as it were, by himself; but without such aid the pictorial genius is strong in the verse. The ideas are typically concrete; not only the Damozel, leaning on the bar of Heaven, is seen, with the lilies in her hand, and on earth the fall of autumn leaves, and in the sky the 'curled moon'; but from all points of view the appeal is to the eyes, as in that imaginative glimpse of the world spinning far below the bridge of Heaven; and in the picture of

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souls ascending to God like thin flames—such as William Blake could have drawn; and in that “strong level flight” of the angels. The three lilies in the Damozel’s hand and the seven stars in her hair, and the five handmaidens of the Virgin, are definitely numbered for the effect of concreteness; Rossetti habitually employs the device, as Keats employed it in the ‘Belle Dame Sans Merci,’ after the manner of the old English ballads—a manner that strongly influenced Rossetti. Partly from the ballads ‘The Blessed Damozel’ derived some of its mediæval flavor; but the quality was really personal with the poet. Here as in his other poems Rossetti manages to reproduce the romance of the archaic, without any great reproduction of the archaic itself. The furnishing of Heaven in the poem is quaint and remote, in effect like the lovely names of the five handmaidens; but the thought or attitude of no particular past time is revived. Perhaps some of this pseudo-archaic flavor comes from the strange verse-music, which Rossetti introduced into English. The secret of much of its charm is veiled in the poet’s genius, but its most striking trait, its melancholy evenness, can be explained by Rossetti’s training in Italian prosody. In writing English poetry he departs radically from the genius of English metre; instead of fitting the words, with their natural accents undisturbed, into the regular beat of the verse—so placing them that the natural reading of the line would determine the rhythm,—Rossetti allows a preconceived rhythm to determine the accent of the words, as in the line ‘With her five handmaidens, whose names,’ etc.

These characteristics of ‘The Blessed Damozel,’ and others besides, reappear more marked in other poems—the subtlety of thought, in ‘Love’s Nocturne’; the mediæval mood of devotion, altogether or almost religious, in ‘Ave,’ and in ‘The Portrait,’ with its splendid closing image; the ballad element, together with the unusual skill in reproducing physical sensation, in ‘Eden Bower,’ ‘Troy Town,’ and the longer ballads; and the same sad, even music in them all. Among his other verse the elaborate ballads—‘Rose Mary,’ ‘The White Ship,’ ‘The King’s Tragedy,’ show Rossetti’s debt to ballad literature, and at the same time mark the wide gulf between the clear simplicity of the old narratives and the wrought loveliness of his work. In his shorter ballads, however, such as ‘Stratton Water,’ he is much simpler. What hold he had on real life is powerfully concentrated in ‘Jenny,’ probably his most thoughtful poem.

Rossetti’s sonnet sequence, ‘The House of Life,’ undoubtedly places him among the masters of the sonnet form, though none of the sonnets, perhaps, are so well known as ‘The Blessed Damozel.’ Technically, they have more of the rise and fall of the best Italian models than is usual in English poetry, and at times, as in the first sonnet, or the twenty-fourth or the twenty-fifth, their cadence is superb. But in many of them the mystical subject-matter is baffling, and Rossetti’s characteristic evenness of manner, here also an evenness of mood, makes the sequence monotonous at last. Perhaps Rossetti’s best sonnets were written singly for pictures—as the beautiful ‘Lilith’ and the ‘Venus Verticordia,’ with the three wonderful lines at the end.

The most widely known of Rossetti’s trans-

lations are the three from Villon, especially the ‘Ballad of Dead Ladies,’ and Dante’s ‘Vita Nuova.’ In all of his translated verse, however, the same traits are found as in his original work—the same exquisite, rather than great mood, the same concrete, yet remote, aspects of beauty, and the same un-English music of the verse. He has many imitators in both his arts.

Bibliography.—The best edition is by W. M. Rossetti. For biography and criticism, consult Introduction to the above; ‘Dante Gabriel Rossetti; His Family Letters,’ with memoir by W. M. Rossetti; Hall Caine, ‘Recollections of Dante Gabriel Rossetti’; Walter Pater, in ‘Appreciation’; the same essay in Ward’s ‘English Poets.’

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Rossetti, Gabriele, Italian poet: b. Vasto, Abruzzo Citeriore, 28 Feb. 1783; d. London, England, 26 April 1854. He was educated at the University of Naples and in 1814 was appointed curator in the Museum, there. He joined the Liberals and in 1815 became a member of the secret society of the Carbonari. He was a supporter of the constitution which King Ferdinand was forced to grant as the result of a military uprising, and when in 1821 the constitution was abrogated and its adherents proscribed Rossetti was compelled to fly the country. He went first to Malta and in 1824 to London where he was engaged as a teacher of languages and was elected professor of Italian at King’s College, London, in 1831. In his political opinions he continued an ardent Liberal, but was in favor rather of a constitutional monarchy than a republic. In religion, though never wholly abjuring the Roman Catholic creed, he was for many years practically a freethinker, though in later years he accepted an undogmatic form of Christianity. In 1845 blindness compelled his resignation from the college. His works include: ‘Dante, Commedia’ (1826); ‘Lo Spirito Antipapale che produsse la Riforma’ (1832); ‘Poems’ (1833); ‘Il Mistero dell’ Amor Platonico del Medio Evo’ (5 vols., 1840); ‘La Beatrice Dante’ (1842); ‘Il Veggente in Solitudine’ (1846); ‘L’Arpa Evangelica’ (1852); etc.

Rossetti, Maria Francesca, English author, daughter of Gabrielle Rossetti (q.v.): b. London, England, 17 Feb. 1827; d. there 24 Nov. 1876. She engaged in teaching and in literary work, the latter, being chiefly of an educational or religious character, and in 1874 entered the sisterhood All Saints’ Home, London, where she died. Her works include: ‘Exercises in Idiomatic Italian’ (1867); ‘A Shadow of Dante’ (1871); ‘Letters to My Bible Class’ (1872); etc.

Rossetti, William Michael, English poet and art critic, son of Gabrielle Rossetti (q.v.): b. London 25 Sept. 1829. He was educated at King’s College, London, and entered the excise office in 1845. From 1860–94 he was assistant secretary to the board of inland revenue, and is at present professional assistant to the same board for estate duty on pictures and drawings. He has published: Blank verse translations of Dante’s comedy ‘The Hell’ (1865); ‘Lives of

Famous Poets' (1878); 'Life of Keats' (1887); 'Mémorial of Dante G. Rossetti' (1895); 'Gabriele Rossetti' (translated autobiography 1901); etc., besides much editorial work, including the works of many poets and the 'Rossetti Papers' (1862-70-1903).

Rossi, Francesco de, frân-chēs'kō dā rōs'sē, known as Il Cecco di Salviati, Italian painter: b. Florence about 1510; d. Rome 1563. He was a pupil of Michelangelo and Parmigiano and a painter of history and mythological subjects. Little is known of his life, excepting that he went to France, made enemies by his eccentric conduct and reckless wit, and found little patronage there. He is said by Vasari to have decorated many Italian palaces and there are examples of his work in several of the great European collections, including his 'Charity' in the English National Gallery; and his 'Holy Family' in the Prado Gallery, which show him to be somewhat mannered in execution, but none the less a painter of the Florentine school at its best.

Rossi, Giovanni Battista de', jō-vān'nē bāt-tēs'tā dā, Italian archæologist: b. Rome 23 Feb. 1822; d. there 20 Sept. 1894. He was distinguished for his studies of the inscriptions of the early centuries of the church, and made important discoveries in the catacombs. He was made a member of the Berlin Academy of Sciences and corresponding member of the French Institute. He published: 'Inscriptiones Christianæ Urbis Romæ septimo Sæculo Antiquiores' (1861); 'Roma Sotteranea Christiana' (1864-77).

Rossini, Gioachino Antonio, jō-ā-kē'mō ān-tō'nē-ō rōs-sē'nē, Italian composer: b. Pesaro 29 Feb. 1792; d. Passy, near Paris, 13 Nov. 1868. He was born of poor parents, and when only 10 was able to support his mother by singing solos in church. He also took the part of Adolfo in Paer's 'Camillo' at the theatre of the Commune—his only appearance as a dramatic singer. He began his musical studies with his parents, but later he studied composition and counterpoint under Tesei and Mattei, both of Bologna. His first opera, 'Demetrio e Polibio,' was composed before his studies under the latter, and even at that stage of his career he had mastered the art of imbuing his music with feeling. His first public appearance as a dramatic composer was at Vienna in 1810, when his opera 'La Cambriale di Matrimonio,' was performed. Successful though it was, it did not contain any definite evidence of power to assert a new school or create a radical change in style. It had been preceded in 1808 by 'Il Pianto d'Armonia per la Morte d'Orfeo,' a cantata, which gained the prize at the Liceo and was performed in public on 8 August of that year. His next composition was 'Didone abbandonata,' a cantata, followed by an opera buffa, 'L'Equivoco stravagante,' which brought him fresh triumphs. Early in 1812 he produced two buffa operas, 'L'Inganno felice' and 'L'occasione fa il Ladro,' ossia il Cambia della valigia, each of which contained several songs full of force and original melody. He attempted one oratorio, 'Ciro in Babilonia,' which unhappily proved a failure. In the autumn of 1812 he wrote a musical two-act comedy 'La Pietra del Paragone,' produced at the Scalà with immense success. In the finale occurs the first instance of his employment of

the *crescendo*, for which he became famous later, and which Mosca declared had been borrowed from his own 'Pretendenti delusi.' In 1813 Rossini composed 'Tancredi,' an opera based on Voltaire's drama, full of good situations and patriotic sentiment. Its choruses are rich in martial passages. 'Di tanti palpiti' became popular everywhere, and made Rossini the most famous composer living. During that year he also wrote 'L'Italiana in Algeri,' containing the charming trio 'Papataci' and the patriotic air 'Pensà alla Patria.' During the next two years Rossini wrote eight operas, including the well-known 'Barbiere di Siviglia' and 'Otello,' while in 1817 he produced his celebrated operas 'La Cenerentola,' 'La Gazza ladra' and 'Armida,' but critics still regarded him as a 'mere musical figure-maker and a diluter of melody into mere ornament.' 'Ermione,' his next opera, has been styled a 'system of word-painting.' His next notable compositions were 'Adelaide di Borgogna' (or 'Ottone Rè d'Italia,' as it is sometimes called), and another oratorio, 'Mosè in Egitto.' The former was produced during the Carnival of 1818 and was warmly received, and the latter at the San Carlo in Naples. During the summer of 1818 he wrote 'Adina, o il Califfo di Bagdad' for the San Carlo theatre in Lisbon, and 'Ricciardo e Zoraide' for the San Carlo in Naples, an opera full of ornament. His 'La Donna del Lago' seemed to show that Scott's works were becoming popular even in Italy. In this opera and others that followed, such as 'Maometto,' 'Zelmira,' 'Semiramide,' etc., it was plain that Rossini was half a century ahead of his day. His style was changing; his gaiety had disappeared; he was becoming serious. He now visited England, on the invitation of the manager of the King's theatre in London, to write an opera for that house, to be called 'La Figlia dell' Aria,' for which he was to receive about \$1,200. He arrived in London in December 1823, with his wife, Isabella Colbran, a singer, to whom he had been married about two years, and while there was much lionized. He acted as accompanist at numerous soirées, gave several concerts, singing the solos on two occasions in a cantata which he had composed for the occasion under the title 'Homage to Lord Byron,' and in five months had acquired nearly \$35,000. He then undertook the musical direction of the Théâtre Italien in Paris for 18 months at a salary of about \$4,000 a year. He here reproduced some of his operas, for example, 'La Donna del Lago,' 'Semiramide,' 'Zelmira,' etc., and also brought out a new one—'Il Viaggio a Reims, ossia l'Albergo del Giglio d'Oro,'—composed for the coronation fêtes of Charles X. The sinecure positions of 'Premier Compositeur du Roi' and 'Inspecteur Général du Chant en France,' were now given him, with an annual income of 20,000 francs, or about \$4,000. He then revised the music of 'Maometto,' brought out under the title 'La Siège de Corinthe,' and also reproduced 'Mosè,' with many improvements and additions, some of the interpolated airs being taken from 'Armida' and 'Ciro in Babilonia.' He next resolved to try his skill at lyric opera, and adapted to the 'Le Comte Ory' some of his favorite music in the 'Il Viaggio a Reims,' but it is said that the best part of the drinking chorus was borrowed from Beethoven's 8th Symphony. His next opera, commonly re-

garded as his masterpiece, was 'Guillaume Tell,' which was produced at the Académie on 3 Aug. 1829.

With its completion the prolific career of the composer may be said to have ended, for though he lived nearly 40 years longer, a few songs, his 'Stabat Mater' and the 'Petite Messe Solennelle' are about all he wrote. These 40 years were spent at Bologna and at Passy, where he died.

Determining to revisit Bologna, where his mother had died in 1827 and where his father was still living, he resigned his post, but made an agreement with the government to compose operas for the French stage for the next ten years, and to produce one every two years, receiving 15,000 francs for each. Should this plan not be carried out, he was to receive a pension of 6,000 francs. On account of the abdication of the king of France and the revolution of 1830, he returned in November 1830 to Paris. The new government, however, was not willing to recognize the agreement above mentioned, and for several years he fought his case in the courts, it being eventually decided in his favor. During this time he wrote his 'Stabat Mater.' In 1830 he again left Paris for Bologna, where his father died in 1839. He now wrote a number of songs and choruses, among which may be cited 'Inno popolare,' for the accession of Pius IX. His wife died in October 1845, and two years later he married Olympe Pelissier, whom he had met in Paris. In 1855 he again returned to Paris. His 'Petite Messe Solennelle' was produced on 14 March 1864, and he afterward scored it for a full orchestra, in which form it was given at the Théâtre Italien on 28 Feb. 1869, three months after his death. "Next to the Emperor," writes one of his biographers, "he became the first man in this city of arts and artists."

Rossini's position among the world's greatest composers has been much discussed. His joyous disposition and light-heartedness have been used as arguments against classing him with such profound composers as Mozart and Beethoven, the latter of whom is recorded as having characterized Rossini's work as "degrading the art in general wantonness with a negligence bordering on frivolity." It has been often said that Rossini's melodies are conspicuous for great sweetness and wonderful sensuous attraction, as for instance in the first finale of 'Cenerentola,' or as evidenced by the jolly roguery of the 'Barber of Seville.' This is unquestionably true, and these are the fruits of his special form of genius. They are his natural endowment, and probably if he had at that time tried ever so hard to write in a different vein, he would have failed. His melodies were intended to please the public, for whom he wrote, and they fulfilled their mission to perfection. That he accomplished much for music cannot be gainsaid, and especially for operatic music in Italy.

Rossini devoted his talents very largely to composing operas, and the list of his works contains the titles of between 50 and 60, including a few which he recast. It should be remembered that with few exceptions he, an Italian, wrote for Italians, and therefore gave them that for which they craved. If he overstepped their limitations, they were dissatisfied; as for instance in 'Otello,' where he was actually compelled to modify the tragic termina-

tion in order to save it from being banished from the Italian stage. The Italians wanted nothing very romantic or sentimental, but as long as Rossini filled his operas with buffoonery and comical situations, they met with unqualified success. All this was changed in 'Guillaume Tell,' the music of which manifests a mind filled with deep emotions and a profound appreciation of the romantic. It is as though he had suddenly determined to disarm his critics by proving himself capable of rising to great heights when the occasion demanded. This work has been well described as a great tone-painting of Switzerland, a kind of pastoral symphony in opera form to which the fable of William Tell is only an accessory. The basic characteristics of his previous operas are absent here, and as though transformed by magical power, he suddenly appears no longer as the buoyant artist of old, but as one in whom had been created an innate love of the true and the beautiful. The sensuous gave place to a grand conception of all that was worthy in musical art.

Notwithstanding the immense popularity of Rossini's compositions, there have been pointed out certain peculiar features repeated over and over again which have caused some of his critics to temper their praise. Nor were these peculiarities entirely of Rossini's own creation, some of them having been borrowed from the works of Generali, Velluti, and others. Prominent among them is the use of the crescendo, "which," says one, "appears as regularly and invariably in his overtures and finales as horse-radish with a joint of roast beef." The constant use of triplets is another mannerism which has provoked adverse criticism, while the undue prominence of appoggiaturas (leaning notes), in many cases of longer duration than the harmonic notes to which they are attached, has also been condemned, as well as his practice of closing his periods by modulating them from the major tonic to the minor mood of the lesser third below, or of the great third above the major tonic. A more serious charge made against him was that of plagiarism, it being stated that besides resorting to the national airs of Italy, he availed himself to a great extent of the ideas of Generali, Cimarosa and other Italian composers, as well as of several German composers, such as Haydn, Mozart, Krommer, etc. Thus, while no competent critic has denied that Rossini possessed genius of an extraordinary character, many are inclined to believe that his inventive faculties were confined within quite measured limits.

In spite of all this, there can be no doubt that his compositions form a memorable epoch in the history of musical art. It was he, moreover, who substituted singing for the endless recitatives which had been in vogue, and he also gave the bass voice a leading part, insisting, too, that a singer should sing the notes of the composer without any additions of his own. He also made the chorus an important feature, and fortified the orchestra by adding wind instruments to the strings, which alone had hitherto been used.

It cannot be questioned that wherever his operas appeared, they became firmly established and in many instances almost banished the classic works of the greatest masters who had preceded him. Thus, in Italy, they nearly sup-

ROSSITER—ROSTOV

planted the works of Pasiello, Mayer and others, including even Cimarosa. In Germany the national predilection was for graver music, but even there Rossini was, as one of his biographers puts it, "lord of the ascendant." While he rarely, if ever, reached the tragic grandeurs of Gluck, or the intense feeling of Mozart and Weber, his music is never dolorous and heavy, as is the case with some of the best compositions of the German school. Forceful and precise rhythm is another of his principal characteristics, while his scores are notable for their simplicity of outline and primary conception, although his manner of decorating the framework was at times intensely florid. Consult biographies by Beyle-Stendhal (1823, new ed. 1892); Azvedo (1865); Edwards (1869); Zanolini (1875).

Rossiter, rōs'tēr, Thomas Pritchard, American artist: b. New Haven, Conn., 29 Sept. 1817; d. Cold Spring, N. Y., 17 May 1871. He early developed a talent for art and secured Jocelyn of New Haven as his instructor. He studied in Rome 1840-6, and on his return opened a studio in New York, where he was elected a National Academician in 1849. He painted historical and religious subjects, and was an admirable colorist.

Rossland, rōs'land, Canada, an incorporated city since 1897, in the West Kootenay District, British Columbia, on the Canadian Pacific and Spokane Falls and Northern railways, near the international boundary-line. It is the receiving and distributing centre for one of the richest gold-mining districts of British Columbia. Silver and copper are also found; and great smelters and reducing works have been erected here and at Trail, about 10 miles distant. The town is well built, and has schools, churches, wholesale and retail stores, banks, and daily and weekly newspapers. Pop. about 7,000.

Rostand, rōs-tān, Edmond, French poet and dramatist: b. Marseilles 1 April 1869. He obtained his education at the Marseilles Lycée and the Collège Stanislas of Paris, and in 1891 was admitted to the practice of law. His first book, 'Les Musardises' (1890), a collection of verse, attracted scant notice; nor was 'Pour la Grèce' (1897), a poem which he recited for the benefit of wounded Greeks and Cretans in the Græco-Turkish war, much more successful. As a playwright, however, he at once met favor. His 'Les Romanesques' (1894), and 'Princesse Lointaine' (1895), both in verse, were applauded by public and press. But they were quite outdone by his 'Cyrano de Bergerac' (1897), a five-act drama in verse, which proved to be one of the most conspicuous successes of the modern stage, being presented in Paris 500 times consecutively, with Coquelin in the title-role. It was given also in the United States in English by Richard Mansfield and in French by Coquelin. It employs the historic figure of de Bergerac (q.v.), duelist and author. 'L'Aiglon' (1900), based on the story of the King of Rome, was given in the United States by Sarah Bernhardt, who created the part in Paris, and, in English, by Maude Adams. Rostand was elected to the French Academy 30 May 1901, the youngest "Immortal" ever admitted. His versification is finished and brilliant, his wit keen and polished; and added to these, his work displays a certain enthusiasm and spontaneity. He contributed,

with Stephen Phillips (q.v.), to the much talked of renaissance of the poetic drama. Among English translations are 'Cyrano' by Thomas and Guilenard (1898) and Hall (1898); 'L'Aiglon' by Parker (1900); 'Les Romanesques' by Fleming ('The Fantasticks' 1900) and Hendee ('The Romancers,' 1899).

Rostock, rōs'tōk, Germany, in the grand duchy of Mecklenburg-Schwerin, on the left bank of the Warnow, 80 miles northeast of Lübeck, is one of the most important cities on the Baltic. It consists of three parts: The Old, the New, and the Middle Town. The east or old town bears the impress of an old Hanse town; the Middle Town is the most modern and best-built. The most noteworthy points of interest are: the palace of the grand duke; the town-house, with its seven towers; the church of Saint Mary (1400) and other parochial churches; the university (1419), attended by about 500 students; the house in which Blücher was born, and the one in which Grotius died; schools, hospitals, etc. The fine promenades surrounding the city were formed on the site of the old fortifications. There is an extensive trade in agricultural products and salt, and important fisheries.

Rostopchin, rōs-tōp'ch'in, or **Rastopchin**, Feodor Vassilievich, Count, Russian general: b. Province of Orel, 23 March 1763; d. Moscow 12 Feb. 1826. He entered the Imperial Guards as lieutenant, was highly promoted under Paul I., but afterward dismissed in disgrace. Under Alexander he became governor of Moscow, and exercised an important influence over the campaign of 1812, even if the assertion of the French that the burning of the city was his work should be untrue. He himself denied this charge in his 'Vérité sur l'Incendie de Moscou' (1824). It is certain, however, that he caused his villa near Moscow to be burned, and took measures for the destruction of the magazines in that city. In 1814 he accompanied the Emperor Alexander to the Congress at Vienna. He afterward traveled, and spent several years in literary pursuits in Paris. His works include a number of historical memoirs, comedies, etc., written in French and Russian, and published in 1853. Consult Schnitzler, 'Rostopchine et Koutousoff' (1863); Segur, 'Vie de Comte Rostopchine' (1872).

Rostov, rōs'tōf, or **Rostoff**, Russia, in the government of Ekaterinoslav, picturesquely situated on a prominent summit above the Don, 20 miles from its mouth in the Sea of Azov. It is the oldest town of eastern Russia, a centre of considerable traffic, and some domestic industries, and its annual fair establishes the prices of cotton goods preliminary to the great fair of Nijni-Novgorod. The chief objects of trade are grain, flour, tobacco, drugs, herbs, saddlery, linen manufactures, and enameled sacred pictures. It has ever counted as an important point, from the period when first contended for by Slavs and Finns. After the Mongolian invasion it declined, and was successively plundered by Tartars, Lithuanians and Poles. Electric lighting, street railroads, and telephones are among its modern features. The ancient cathedral (1216) contains precious sacred relics of Christian missionaries and princes. Pop. about 125,000.

ROSTRA—ROTARY STEAM ENGINE

Ros'tra, a name given the platform or stage in the forum in Rome, whence the orators used to harangue the people, so called from the beaks (*rostra*) of the ships taken, in 338 B.C., from the Antiates, with which it was adorned. It was a circular structure raised on arches, with a stand on the top, bordered by a parapet, the access to it being by two flights of steps.

Roswitha, rōs'vê-tā, or **Hrotswitha**, hrōts'vê-tā, German poet: b. about 932; d. about 1002. She was of Saxon birth and a nun in the Benedictine convent of Gandersheim, Brunswick; the first German poet and the first dramatist since the Roman period. She wrote sacred legends, a poetical chronicle of the reign of Otto I., and six Latin comedies for performance before the sisterhood. The latter were imitations of Terrence, and without attempting a development of character they displayed rapidity of action and good theatric effect. Her works were first published at Nuremberg in 1501; translations were made by Benedixen in 1850-3. The best edition was published by Barack in 1858. Consult Kōpke, 'Hrotsuit von Gandersheim' (1869).

Rosy Finch, one of the large finches of the genus *Leucosticte*, several species of which inhabit the higher parts of the Rocky Mountains and the colder parts of northwestern America, coming southward in winter. Their plumage is suffused with rose-red, brightest in the males, and in the spring they have a loud and pleasant song. The best known species is *L. tephrocotis*, common in Colorado and Utah in winter. Consult Coues, 'Birds of the Northwest' (1874).

Rot, a disease in sheep and other gramivorous animals, produced by the hydatids *Fasciola hepatica* and *Distoma lanceolatum*, often living in great numbers in the gall-ducts and bladder of the animal. (See SHEEP.) Also the popular name for many fungoid diseases of plants. See DISEASES OF PLANTS; FUNGI.

Rota Romana, rō'tā rō-mā'nā, or **Ruota Romana**, signifies an ecclesiastical tribune of the Roman Catholic Church situated at the papal court; from this situation probably comes the name of the tribunal, since the old papal courts were decorated with mosaics in the shape of wheels or *rotae*. The Rota Romana was at one time a body of vast judicial power, having jurisdiction not only over all cases of appeal and all disputes of beneficiary and patrimonial nature, but as well over the more important class of all cases concerning ecclesiastical benefices. These last are no longer within the jurisdiction of the court, its power being diminished of necessity by the political position of the papacy of to-day. But over the first two classes named the court has full jurisdiction, its decree being final, inasmuch as the only appeal permitted is one directly to the Pope.

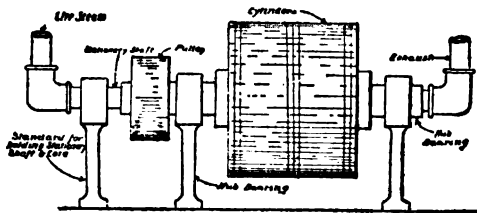
The Rota Romana was, and still is, a collegiate body, although its constitution has undergone radical changes in recent years. Originally it was composed of 12 prelates, mostly Italians, but representing also the other papal states of Catholic Christendom. The meetings which took place in the palace of the Pope twice a week were of supreme importance in the administration of the Roman Catholic Church law throughout the world. The tribuna is now divided into two colleges or senates.

Rotary Steam Engine, a type of engines in which the pistons rotate within the cylinder, or the cylinder upon the pistons, thus giving a continuous rotary motion and eliminating the loss of power consequent to the necessary change in the direction of motion of a piston working horizontally in a cylinder, as in the case of an engine operating with a reciprocating action.

The varieties of rotary engines are numerous, consisting of machines equipped with one, two, three, and four pistons on single axes, or of pistons working in pairs on several axes, operated by steam injected against them, or working by the reactive action of steam emitted tangentially. The basic principle was suggested by the inventors of the last century, among whom Watt, Cartwright, and Galloway may be included; while among the notable engines of this class may be mentioned the Scheutz (Swedish), the Thompson (Scotch), the Behrens (American), and the Pillens and Hill (English), in all of which the pistons revolve within the cylinder, and differ from each other only in the details of the mechanical arrangements employed to utilize the pressure of the steam.

In another form perfected by Harris, portions of the engine are attached to two hubs and run in different directions. The hollow trunnions of one axis carries the two radial arms which emit steam at their ends tangentially against vanes carried on the other axis with a direct driving action. By gearing the two motions are utilized upon a single shaft. The latest development, and perhaps the most efficient, is that perfected by William M. Hoffman, of the type in which the cylinder revolves around the pistons upon an elliptical steam-chest supported by a hollow shaft through which the steam is admitted and exhausted.

Fig. 1 shows a side view of the engine in which A is the revolving cylinder; B, steam entrance to hollow shaft; C, shaft and ellipse support; D, bearings of revolving cylinder; E, steam exhaust from hollow shaft, and F, power connection for gearing or belting.



Standard for holding stationary shaft and core.

Fig. 2 shows a cross section of the cylinder A; the ellipse E, supported by sleeves upon the hollow shaft S; and two segmental blade pistons B and C, which extend the entire length of the cylinder to which they are attached by the cranks G.

By construction the expansion chamber L is formed of three sides—the inner surface of the cylinder, and the outer surface of the ellipse,

ROTATION—ROTATION OF CROPS

both of which are rigid, and the convex surface of the piston B, which is free to move into and out of its housing D.

In operation, the steam is admitted at one end of the hollow shaft S, and exhausted at the

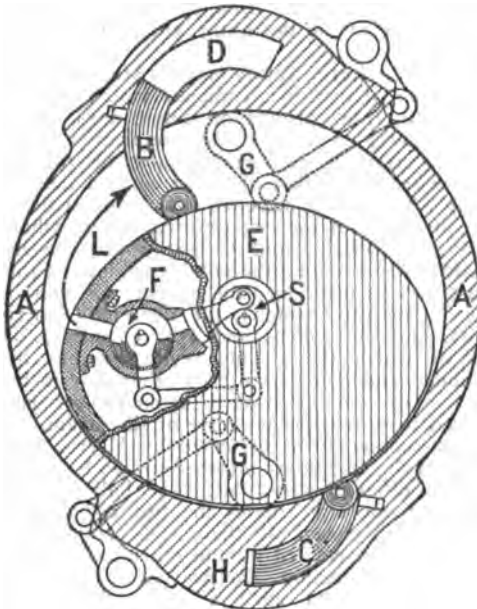


FIG. 2.

other after having been utilized by the action of an automatic cut-off arrangement which allows it to enter the chamber L, through the port F, where it expands and pressing against the piston B, moves it forward over the ellipse, thus causing the cylinder to revolve. As the piston B approaches the greater dimension of the ellipse, it is forced into its housing D, where it forms an abutment against the escape of steam; while the piston C, arrives opposite the port F, exhausts the steam, and relieved of the pressure of the greater dimension of the ellipse emerges from its housing H, and forms the free side of a new chamber L, into which the steam is again admitted by the automatic cut-off to expand and continue the action already described.

Rotary engines are designed to obtain the greatest possible efficiency with the least amount of fuel consumption, and a great reduction in engine-room floor space. Engines capable of developing 300 horse-power, at 2,000 revolutions per minute have been successfully and economically operated.

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Rotation, (a) in astronomy, the turning round of a planet on its imaginary axis, like that of a wheel on its axle. The rotation of the earth is performed with a uniform motion from west to east, and occupies the interval in time which would elapse between the departure of a star from a certain point in the sky and its return to the same point. The only motions which interfere with its regularity are the precession of the equinoxes and nutation. The time taken for the rotation of the earth measures

the length of its day. So with the other planets. The sun also rotates as is shown by the movement of spots across its disk (see SUN). The earth's rotation slightly increases the force of gravity in moving from the equator to the poles. Sir William Thomson, reasoning from some small anomalies in the moon's motion, inferred that 10,000,000 years ago the earth rotated one seventh faster than it does now, and that the centrifugal force then was to that now as 64 to 49; (b) in botany, the movement of the protoplasm observed in the cells or cell-walls of certain plants. Little or nothing is definitely known as to the causes that bring it about, but it is probably related to the similar motion in amoeba and other low orders of animal life; (c) in mechanics. See MECHANICS.

Rotation of Crops, the order in which crops are grown during a series of years on the same land. The advantages of this practice are: (1) All plants tend to exhaust the soil, but in different degrees, hence a rotation tends to maintain a balance. Thus at the Rothamsted Experiment Station, England, where wheat has been grown on the same land for 62 successive years without manure or fertilizers, the average yield is about 13 bushels per acre, or nearly the same as the average yield in the United States, while where grown in a four-course rotation of rutabagas, barley, beans or clover, wheat, the average yield during a period of 52 years is nearly 27 bushels per acre, without manuring or fertilizing. (2) All plants do not take up the same ingredients in the same proportion; thus, crops rich in carbonaceous matter take up relatively small amounts of food from the soil, but large quantities from the air, the latter costing nothing. (3) Some crops give better opportunity for cleaning land, as corn, potatoes. Others cannot be tilled and favor the growth of weeds, as wheat, oats. (4) When several crops are grown on a farm the labor is distributed over a greater portion of the year and it is more economical. The social evils consequent on temporary employment at high wages for a short period of the year, and idleness the rest of the time, cannot be overlooked. (5) Plants vary in their ability to assimilate the plant food in the soil; thus buckwheat and rye are able to flourish where wheat and cabbages could hardly live. (6) The legumes enrich the soil in nitrogen. (7) A variety of crops is essential where cattle and other live stock are kept. (8) In a rotation the increase of destructive insects and diseases is hindered, owing to their not having the necessary crop to prey upon. (9) Some crops permit the sowing of others among them, thus saving time; clover and grass seeds being sown among barley and wheat, wheat sown among corn. (10) Some crops permit the aggregation of the soil particles when they become excessively reduced by tillage, hence land is laid down to grass, alfalfa. (11) Certain crops aid in accumulating humus, as grass, hence such should follow two or three years of exhaustion by tillage. Admitting air to the soil tends to destroy humus and to reduce the water-holding capacity. The loss of humus has converted garden-spots in New York and other Eastern States, northern Africa, Asia Minor, and Spain into wastes, and Sicily, the granary of Italy in the time of the Romans, is now comparatively sterile.

ROTATION OF CROPS

Rotations are described according to the number of years required to complete a circuit, as three-course, four-course, etc. In the latter the tillable land is divided into four parts and each crop is grown on part of the farm each year. The folly of growing the same crop on the same land for several successive years was noted by the Romans and others, as also the benefits derived from growing a leguminous crop, as alfalfa or clover, previous to a grain crop, as wheat. These observations remained unutilized until a comparatively recent date. Rotations have gradually grown into their present forms according to circumstances, and have been and are modified as required and as our knowledge increases. Attention was first drawn to their value in 1777, in a treatise by Dickson of Edinburgh, Scotland.

One of the earliest recorded systems was the "outfield" and "infield," in which part of the land was used for growing grain until its crop-producing power was so reduced that it became unprofitable, when it was allowed to lie idle for a number of years. Increase of population caused a modification, the land being rested or "fallowed" a year at intervals; thus, among the Jews, this was repeated every seventh year. A system of continuous single-cropping has been pursued in the Western States with distinct loss to the nation. Where land is weedy and in dry districts, as parts of California, the east of England, etc., bare fallowing or the cultivation of the soil without growing a crop is still considered good practice, sufficient moisture being conserved to ensure a profitable crop the succeeding year. A development from this system consisted of the introduction of green crops, either intertillage crops, as corn, turnips, potatoes, cabbages, etc., if the land was weedy and needed cleaning, or of legumes, as clover. The advantages of a crop-fallow are that the land is turned to profitable use; it is cleaned and the available nitrogen present as nitrates, is not so liable to be lost by percolation, being taken up by the crops; that humus is produced from the root-residue; and that if a leguminous crop is grown it enriches the soil in nitrogen by means of the bacteria on its roots.

In 1788 Marshall of England stated that a common rotation was: 1st year, wheat, barley, or bigg; 2d year, oats, beans and pulse; 3d year, bare fallow. A distinct advance was made with the realization of the value of the Norfolk four-course, which was practised on light land and originally consisted of roots, barley, clover, wheat. The principles involved are: (1) that a deep-rooted crop shall succeed a shallow-rooted one, barley being shallow-rooted and clover deep-rooted; (2) that crops of the same natural order and somewhat like tendencies, as wheat and barley, both being straw-crops and more or less subject to similar enemies, shall not succeed each other; (3) that a weedy crop shall be followed by a cleaning one, as the roots after the wheat; and (4) that a leguminous crop shall have a place in each rotation. The advantages of this system were: (1) The wheat was grown after a nitrogen-gathering crop; the clover stubble was readily prepared for wheat in the fall, or if stock feed was scarce it could be pastured late and spring wheat or oats grown instead. The wheat was harvested in time to permit the land being fall-plowed and cleaned for

the succeeding root crop. (2) The fallow crop, roots, received manure and intertillage, and gave an opportunity to clean the land and stir it deeply. It furnished work for the horses in summer in cultivating, and a bulky crop of succulent feed for stock, which with the hay furnished considerable manure. (3) A grain-crop follows well after a root crop, and generally little or no plowing is needed. Barley is a good crop to seed with, as it occupies the land but a short time and is not so exacting on the soil moisture as oats. (4) The clover requires a firm seed-bed, and if the roots were consumed on the land and shallow tillage given in fitting the land for the barley such was secured. The barley permitted a good growth of clover which enabled it to withstand the winter. This crop supplied the hay. The disadvantages of this system are that it is too short, the land being liable to become both clover and turnip sick, and the turnips affected with "club-root." Under these circumstances clover and turnips could be taken every eighth year, substituting beans, peas or cowpeas for the former, and potatoes, etc., for the latter. Such close cropping renders the rotation expensive, the labor bill being high, but the cost may be reduced by leaving the grass and clover seeding down for two or three years, thus making a five or six years' rotation, or it may be used as the basis for a 7 or 8 course. This rotation is capable of adaptations as follows: (1) Grain—wheat, oats, barley, rye, corn, buckwheat; (2) Cleaning or fallow crop—corn, potatoes, sugar beets, mangels, tobacco, cabbages, turnips, rutabagas, rape, cowpeas, soy beans, sorghum, etc.; (3) Grain—barley, oats, rye, wheat, corn; (4) Legume—clover, grass and clover, cowpeas, soy beans; (5) Legume—grass and clover, mown once and pastured, or pastured all the year.

In the United States the rotations of crops vary considerably in different sections. In many places the succession of crops is dictated rather by accident or convenience than by any well considered principles. Corn and wheat or oats formed a common two-course rotation with the early settlers, until the land failed to produce a crop of wheat when corn was grown every second year, the land going to weeds in the interval. The "Eastern Shore rotation," which is a two-course, consists of corn followed by oats, with a secondary crop of Magoth Bay beans. The growth of this leguminous crop, while curtailing the yield of oats, furnishes considerable green manure for plowing in. The first system on the best cultivated farms in Virginia was a three-course, beginning with corn, and succeeded by wheat, in which the grass and weeds were allowed to grow and be grazed the third year. One well known farmer in Virginia grew clover in place of the weeds the third year to furnish green manure. A later rotation was: (1) corn or oats; (2) wheat and clover sown; (3) clover grown and plowed under in August, and the land seeded to wheat for the fourth year.

An old and successful rotation recorded for New England is corn, oats, and timothy and clover, the latter remaining down for three years, thus two plowings are required in five years, one for corn, and a light plowing for oats, the grass and clover seed being sown among the oats. A modern three-course rotation for the Eastern States is potatoes,

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winter rye, clover. This is a modification of a well-known Middle Western rotation, potatoes, winter wheat, clover. It embraces a root crop, a cereal and a leguminous crop. It is well suited to light and medium soils and is economical in labor, but one deep plowing being required in three years, that for the potatoes, the land being prepared for the rye by disking. The potatoes are a cash crop, the rye furnishes bedding and feed for stock, and the clover furnishes hay, and is not left down long enough to be seriously injured by the clover-root worm. The rotation is too short for many places, and probably the land would become clover-sick. It may be converted into a four-course by growing a crop of corn after the clover, and into a five-course by sowing grass with the clover and leaving them down for two years, thus corn, potatoes, rye, grass (timothy, redtop, etc., clover), mown, grass mown and grazed. In this way two fifths of the tilled land is plowed each year, that for corn and potatoes; the land for potatoes may be plowed in fall after the rye is sown in September, thus reducing the spring work. If milch cows are kept, the corn furnishes grain and stover or may be cut for silage, the rye may be cut green for fodder or allowed to mature, and the area in potatoes might be reduced and cowpeas, soy beans, peas and barley, or some other fodder or silage crop substituted.

For a dairy farm having half the land in permanent pasture, a satisfactory four-course is (1) corn (cut for silage); (2) oats, the land being fall-plowed, the crop furnishing grain and bedding; (3) wheat (sown in fall, the grain being sold or consumed, the straw used for bedding); (4) clover (sown in spring in the wheat). This rotation permits of carrying the maximum amount of live stock and having a large supply of manure, thus enabling the crop-producing power of the soil to be maintained or increased. The live stock furnish constant employment and enable the farmer to make two profits, that of the grower and the manufacturer.

A common rotation in the Middle West is corn, wheat and clover. The wheat is sown in the corn with a one-horse drill before the latter is mature, the clover being sown in the wheat. Labor is a serious problem and this system economizes it, but one plowing being required.

Consult Wheeler, 'A Rotation of Crops,' Bull. 74, 75, 76, Agr. Exp. Sta., Rhode Island (1900); Gilbert, 'Memoranda of the Rothamsted Experiments' (1901).

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Rotch, rōch, Abbott Laurence, American meteorologist: b. Boston, Mass., 6 Jan. 1861. He was graduated from the Massachusetts Institute of Technology in 1884, and in the following year established and has since maintained at his own expense a meteorological observatory at Milton, Mass. On 14 Dec. 1906 he was appointed professor of meteorology at Harvard University. He was the first meteorologist in the United States to measure the height and velocity of clouds, and to use kites with a self-recording instrument for this purpose. He also made experiments in wireless telegraphy. He has written 'Sounding of the Ocean of Air' (1900).

Rotherham, rōth'er-am, England, town in the West Riding of Yorkshire, at the confluence of the Rother and the Don, five miles northeast of Sheffield. The most notable buildings are the market-hall, post-office, court-house, corporation offices, council hall, and a large number of educational, literary, and benevolent institutions, including a mechanics' institute. The town possesses extensive metal works, potteries, glass works, and rope yards. It is of Roman origin and was of some importance in the Anglo-Saxon period.

Rothermel, rōth'er-mēl, Peter Frederick, American painter: b. Luzerne County, Pa., 8 July 1817; d. near Pottstown, Pa., 15 Aug. 1895. He was educated as a land surveyor, but at 22 studied painting, and about 1840 opened a studio as a portrait painter at Philadelphia, and eventually turned his attention to historical subjects. Among his earlier works are 'Christabel' and 'Katherine and Petruchio.' He has also painted many American subjects, among them 'De Soto Discovering the Mississippi,' 'Columbus Before Isabella the Catholic,' the 'Noche Triste' from Prescott's 'Conquest of Mexico'; 'Patrick Henry Before the Virginia House of Burgesses'; and 'The Battle of Gettysburg.' His pictures reveal a fine sense of color and a power of dramatic composition which are not common; but he has a tendency to exaggeration and his overtrained action is very often less genuinely effective than sensational.

Rothschild, rōths'child (Ger. rōt'shilt). The famous European financial house known as Rothschild was founded by Mayer Anselm Rothschild: b. Frankfort-on-the-Main 1743; d. 19 Sept. 1812. He was of Jewish parentage, and was destined for the priesthood, but found commercial pursuits more to his liking, and engaged in trading, afterward entered a banking house in Hanover. His industry, frugality, and sound business methods made him in a few years the master of a small capital, and he returned to Frankfort, where he established the banking house still in existence. The firm originally consisted of his five sons, who established branches of the house in different European cities: Anselm, b. 12 June 1773; d. 6 Dec. 1855; resided in Frankfort; Solomon, b. 9 Sept. 1774; d. 27 July 1855; lived in Vienna; Nathan, b. 16 Sept. 1777; d. 18 July 1836; located at London; Karl (Baron), b. 24 April 1788; d. 10 March 1855; resided in Naples; and Jacob (Baron), b. 15 May 1792; d. 15 Nov. 1868; resided in Paris. The political events of 1813 raised the house of Rothschild to the important position it has since occupied in the commercial and financial world. In 12 years the Rothschilds raised by way of loan or subsidy an amount exceeding £100,000,000 sterling which was distributed by them in nearly the following proportions: England, £40,000,000; Austria, £10,000,000; Prussia, £8,000,000; France, £16,000,000; Naples, £10,000,000; Russia, £5,000,000; several German courts, £1,000,000; Brazil, £2,000,000; exclusive of various other large sums. The remarkable degree of success attained by the house, setting aside the favorable circumstances of which they have taken advantage, may be largely attributed to their strict adherence to two fundamental maxims laid down by the founder of the house. The first

ROTIFERA — ROTTERDAM

of these is their conducting all operations in common. Every proposition of magnitude is laid before each member of the firm, fully discussed, and then executed by their united efforts. The second principle is to set definite limits to each operation and never to aim at exorbitant profits. Their wealth has increased in an unexampled degree, and their reputation and credit have been steadily fortified by fair dealing, reasonable terms, and sagacious and systematic operations which are clearly planned and judiciously executed. The Rothschilds are extremely punctual in meeting their contracts, and before the introduction of the telegraph their couriers were frequently in advance of the government. The advantages of their system and their strength were clearly shown when in 1848 they met conjointly a loss of several millions, which would have crushed any other house, but which the enormous scope of their resources enabled them to meet without difficulty. The members of each succeeding generation are admitted into the firm and much intermarriage among cousins indicates that the family is destined long to retain its control of European finance. Lionel Nathan, b. 22 Nov. 1808; d. 3 June 1879, was the first Jew admitted to the English Parliament, and his son Nathaniel Mayer, b. 8 Nov. 1840; d. 13 June 1905, was created a baron in 1885. Since 1815 the Rothschilds have raised for Great Britain \$1,000,000,000; for Austria, \$250,000,000; for Prussia, \$200,000,000; for France, \$400,000,000; for Italy, \$300,000,000; for Russia, \$125,000,000; for Brazil, \$70,000,000; and in 1895 they purchased \$15,000,000 of the United States bonds controlled by the Belmont-Morgan syndicate. Consult: Reeves, 'The Rothschilds' (1887); 'Das Haus Rothschild' (1857); Von Scherb, 'Geschichte des Hauses Rothschild' (1893); Michaud et Villeneuve, 'Histoire de Saint-Simonisme et de la Famille de Rothschild' (1847).

Rotifera, a group of small, usually microscopic animals, are familiarly known as wheel animalcules, because of the presence at the anterior end of a crown of cilia which in their vibration suggest the rotation of a wheel. The opposite (posterior) end of the body is prolonged into a stalk (foot) which is the organ of attachment in sessile forms or is used in walking by such as are free. It is often segmented and may be terminated by one or two pointed toes, while a cement gland in the foot aids in fixation. The anatomy is simple and usually easily studied in the living animal. In general it recalls that of the embryonic annelid with which the rotifers are often genetically connected (see *TROCHEL-MINTHES*). A vascular system is wanting and the excretory system consists of "flame-cells." The sexes are separate, but the males are rare, degenerate, and needed only for the production of the fertilized winter eggs. Summer eggs develop parthenogenetically. The rotifers are abundant and widely distributed, but confined almost entirely to fresh water. They were among the very first of microscopic organisms to receive attention, and have always been favorite objects of study. A few forms are parasitic in habit and almost all are capable of desiccation and subsequent revival.

Rotteck, röt'ték, **Karl Wenceslaus Rottecker von**, German historian and publicist: b. Freiburg in Baden 18 July 1775; d. there 26 Nov. 1840. He was educated at the University of Freiburg, adopted the profession of advocate, but turned to the study of history, and in 1798 was appointed professor of that department in Freiburg University, a chair exchanged in 1818 for that of natural and international law. In 1819 he was chosen by his university as their representative in the first chamber of the states of Baden, and there proved an ardent champion of political reform. He was one of the founders of 'Der Freisinnige,' a journal with strong democratic leanings, and brought upon himself the displeasure of the conservative party, who compelled him to resign his professorship, and discontinue the editing of all public prints for five years. An ineffectual attempt was made to exclude him from the second chamber of the states, to which he had been elected representative in 1830; but he continued to hold this seat till his death. His chief work is 'Allgemeine Weltgeschichte' (1813-27). Numerous translations of the original work, or an abridgment published by Rotteck, entitled 'Auszug aus der Weltgeschichte,' have appeared in most European languages. It is a critical narrative of prominent events written from a liberal point of view. Other works are: 'Lehrbuch des Vernunftrechts und der Staatswissenschaften' (1829-30); 'Lehrbuch der ökonomischen Politik' (1835); 'Kleinere Schriften' (1829-30); and, with Welcker, a 'Staatslexikon' (1834-44).

Rot'tenstone, a decomposed mineral substance, consisting chiefly of alumina with about one ninth of carbon and half as much of silica. It is supposed to be formed almost wholly by decomposition of shale, and is chiefly found in Derbyshire, England, in South Wales, and near Albany, N. Y. It is either grayish, blackish, or reddish-brown in color, is soft and easily scraped to powder, and is much used for cleaning and polishing metallic surfaces, glass, etc. The term rottenstone is now used to include the tripoli of commerce (first imported from Tripoli, Africa), and also any kind of silicious material suitable for the same purposes.

Rotterdam, röt'ër-däm (Dutch, röt-tër-däm'), Netherlands, one of the chief cities and busiest ports of the country, 36 miles by rail southwest of Amsterdam. Important waterways connect the town with the sea and with the interior. Thus vessels of deep draft may approach quite near, and the amount of tonnage entering Rotterdam (including that which is connected with the inland traffic), is only surpassed by London among European ports. The Hoog Straat, built on the protecting dike, divides the city into Binnenstad and Buitenstad. The intersecting canals cut the Buitenstad into islands. The canals or "havens" are Rotterdam's streets, generally speaking, and the principal buildings line the main "havens." In the Groote Markt is a statue to Erasmus, who was a native of Rotterdam. Saint Lawrence Church, founded in 1414, contains an excellent organ and some fine marble monuments to celebrities. There are churches of all denominations, government offices, academy of fine arts, various museums, several hospitals, and good schools. There are also zoological gardens and a public park.

The modern public buildings form a remarkable contrast to the quaint old-time wooden gabled houses. Rotterdam carries on an active foreign and domestic trade with her colonies, Europe and America. The imports include native produce from her eastern and western colonies, and grain, coal, oil, seeds, etc. The exports are linen, flax, dairy products, gin, and manufactures. Rotterdam boasts many flourishing mills and other industrial works. Pop. about 338,000.

Rotti, rôt'tē, **Rottee**, or **Rotto**, an island belonging to the Netherlands, in the Indian Ocean, northwest of Australia and southwest of Timor Island. It is of volcanic origin; its greatest length is 36 miles, and greatest width 11 miles. It has a bold, rocky coast; the surface of the interior is undulating and the soil is very fertile. The lontar, or palmyra palm, furnishes a juice which is one of the principal articles of food. Maize, rice, millet, cotton, and tropical fruits are plentiful, and cabinet woods are exported. Horses, goats, sheep, pigs, and buffaloes abound. Edible birds' nests and wax are also exported. The natives, supposed to have come originally from Java, are a fine looking race. Pop. about 70,000.

Rottmann, rôt'män, **Carl**, German painter: b. Handschuchshheim near Heidelberg 11 Jan. 1798; d. Munich 6 July 1850. He early established himself at Munich, but finding little congeniality in the studies of the academy, interested himself in the natural scenery of the country, which formed the environs of the city, and by his independent studies he actually instituted a new school of German landscape. His masterly pictures attracted the attention of King Louis, who engaged him to paint a series of Italian landscapes; and his frescoes, executed between 1829 and 1833 in the arcades of the palace gardens, are remarkable for color and masterly power in line. Among his oil paintings may be mentioned: 'The Acropolis of Sicyon' and his 'View of Corfu,' now at Munich in the new picture gallery; 'The Fountain of Callirrhoe,' at Munich; 'Perugia,' in the National Gallery at Berlin. While he was a powerful and imaginative painter in oil, his chief claims to recognition in modern art history are his mastery of water colors and his skill in genuine naturalism.

Roubaix, roo-bä, France, in the department of Nord, six miles northeast of Lille, is a prosperous manufacturing town, containing many mills and factories, dye works, and tanneries. Its public buildings are unimportant. Its woolen and linen manufactures and its carpets are celebrated.

Roubillac, roo-bē-yäk, **Louis François**, French sculptor: b. Lyons about 1695; d. London 11 Jan. 1762. He settled in England about 1720, and a monument designed by him for the Duke of Argyle in Westminster Abbey brought him into great repute. Among his monumental works are statues of Bishop Hough in Worcester Cathedral; of Sir Peter Warren; of Handel in Westminster Abbey; of Shakespeare in the British Museum; and of Sir Isaac Newton at Cambridge.

Rouen, roo-ön, France, chief town of the department of Seine-Inférieure, situated on the

right bank of the Seine, 87 miles southwest of Paris, ranks next to Lyons as a manufacturing city, and is one of the most attractive provincial towns of the republic. Rouen possesses much interest in its public buildings, many of which are almost perfect specimens of Gothic architecture. They include the venerable cathedral of Notre Dame, the product of centuries of construction; begun in 1220 under Philippe Auguste, it has seen many vicissitudes, but its imposing façade surmounted by lofty towers, its richly decorated walls, its exquisite wood carvings, fine sculpture, and beautiful rose-windows, render Notre Dame one of the most remarkable and artistic of Christian temples. The abbey and church of Saint Ouen also in the Gothic style, whose aerial tower terminates in a crown of fleurs-de-lis; the Church of Saint Maclou, a fine specimen of florid Gothic; the Tour de la Grosse-Horloge; the Palais de Justice, of the 15th century, remarkable for the delicacy and boldness of construction; the Hotel de Bourgtheroulde (15th century), with fine reliefs; the archiepiscopal palace; the musée or picture gallery, containing a fine collection of paintings by French masters; and the ancient Halles or market buildings. There is a large library and several museums of scientific collections. In the Place de la Pucelle Joan d'Arc was burnt. Rouen is the birthplace of Corneille, Fontenelle, Boieldieu, and Flaubert. It is the see of an archbishop, and seat of law courts, and possesses a chamber of commerce, an exchange, mint, and schools of science, art, and the higher professions. The staple manufacture is cottons, in every form, one class of which is so specialized as to be known as *rouenneries*. Besides woolen goods, machinery, chemicals, etc., there are numerous industrial works for weaving, refining, and smelting. The location of the city favors trade. The main articles are corn, flour, wool, cotton, coal, petroleum, wine, brandy, colonial produce, and manufactured goods. Rouen was built before the conquest of Gaul by the Romans. It was captured and pillaged by the Normans in the 9th century. Then it was long held by the English until 1449. Pop. about 120,000.

Rough and Ready, a popular nickname applied to President Zachary Taylor during the Mexican War.

Rough-leg, a buzzard-hawk of the genus *Archibuteo*, especially *A. lagopus*, so called because feathered down to the toes. It is known throughout the northern regions of both continents, and is typically whitish, streaked with rust-red; but the American form best known is a melanotic variety (*A. lagopus sancti-johannis*), which frequents the maritime districts of the Atlantic coast, and is less often seen in the interior, except northerly. The western United States and Pacific coast have a second species (*A. ferrugineus*), called in California squirrel-hawk, which is rusty brown, marked with gray, white, and black; or sometimes plain dark chocolate brown. These hawks are large (23 to 24 inches in length), and of fierce and noble appearance; but they have none of the dash and spirit of the falcons, and indeed seem inferior to the buteos in this respect. Their quarry, though diversified, is always humble; they prey upon various field-mice and other very small quadru-

ped, lizards, and frogs, and even insects, rarely attacking birds of any kind, and then only the most defenseless. Open fields, especially in the vicinity of water, are their favorite resorts. They appear heavy and indisposed to active exertion; flying slowly and heavily, and often remaining long motionless on their perch. They show some analogy to the owls in points of structure, as well as in their partially nocturnal habits. Wilson observes that it habitually courses over the meadows long after the sun has set, and Audubon calls it the most nocturnal of our species. The nest is ordinarily built of sticks, etc., in a high tree; sometimes, however, on cliffs. The eggs, three or four in number, measure about $2\frac{1}{3}$ by $1\frac{1}{4}$ inches, largely blotched with different shades of brown, sometimes mixed with purplish slate markings.

Rough Riders, a name borne by the 1st Regiment of United States cavalry and also by the 2d United States volunteer cavalry in the Spanish-American War. The original Rough Riders were the men who carried messages through the Western States before the organization of the pony express in 1859, and the name was used by William F. Cody in his "Wild West" show, which contained a "Congress of the Rough Riders of the World." The army regiments were thus named because of the great number of western ranchmen in their ranks, and played a prominent part in the Spanish-American War. The first regiment was organized by Leonard Wood, who was commissioned colonel, and Theodore Roosevelt became lieutenant-colonel. Before the disbanding of the regiment in 1898 a Rough Riders' Association was formed, to which all members of the regiment are eligible, the right of membership to descend to the eldest son. See ROOSEVELT, THEODORE, and WOOD, LEONARD.

Rough-winged Swallow, a small blackish migratory swallow (*Stelgidopteryx serripennis*) of the United States generally, where it nests in summer in holes in banks, in crevices of rocks, etc., and has the general habits of the bank swallow (q.v.). The genus, of which several other species are known in Central and South America, is peculiar in having the outer web of the first wing-quill converted into a series of stiff recurved hooks, which may be supposed useful in creeping into their holes and in clinging to vertical or overhanging surfaces. Considering the general likeness of the bird otherwise to the bank swallow, the fact that this species often makes its nest and lays its pure white eggs in some cranny about a bridge or building is noteworthy. Consult Coues, 'Birds of the Colorado Valley' (1878).

Rouge, roozh, a cosmetic prepared and used to impart artificial bloom to the cheeks or lips. It is applied by means of a camel's hair pencil, puff-powder, or a hare's foot. When rouge is properly prepared, it is said that its application does not injure the skin. Jeweler's rouge is an impalpable preparation of oxide of iron, obtained by heating the yellow oxalate of iron till it decomposes, carbonic acid escaping, and only a red powder being left. It is used for polishing silver, and for this purpose should be of the finest quality.

Rouge et Noir, roozh ä nwör, or **Trente et Quarante**. trönt ä kä-ränt, a modern game

of chance played with the cards belonging to six complete packs. The punters or players stake upon any of the four chances: *rouge*, *noir*, *coulour*, and *inverse*. The banker then deals a row of cards for *noir*, until the exposed pip number between 30 and 40 (court-cards count 10, aces 1), and a similar row for *rouge*. That row wins which most nearly approaches the number 31, and players staking on the winning color receive their stake doubled. *Coulour* wins if the first card turned up in the deal is of the winning color; in the contrary case *inverse* wins. When the number of pips in both rows are equal it is a *refait*, and a fresh deal is made; but if both happen to count exactly 31 it is a *refait de trente-et-un*, and the banker claims one half of all stakes. This last condition places the banker at an advantage calculated to be equal to about $1\frac{1}{4}$ per cent on all sums staked.

Rouget, Georges, zhörzh roo-zhā, French painter: b. Paris 2 May 1784; d. there 9 April 1869. He studied at the Ecole des Beaux Arts, and later under David, who employed him to finish many of his pictures. He became in consequence an imitator of that master. He painted a large number of portraits, those of Louis XVIII. and of Charles X. being noteworthy, and historical subjects. Of the latter are: 'French Princes Paying Homage at the Cradle of the King of Rome' (1812); 'Death of St. Louis' (1817), at Versailles; 'Œdipus and Antigone' (1819), at Rouen; 'Francis I. Pardoning Rebels of La Rochelle' (1822); 'Marriage of Napoleon and Marie Louise' (1837); 'Napoleon Receiving the Decree of the Senate Proclaiming Him Emperor' (1838); 'Death of Napoleon' (1846). Several of the churches of Paris contain religious subjects painted by him; but the major part of his work may be seen at the Versailles Museum.

Rouget de Lisle, roo-zhā dē lēl, **Claude Joseph**, French song-writer: b. Lons-le-Saulnier, France, 10 May 1760; d. Choisy-le-Roi 27 June 1836. He published 'Fifty French Songs, Words of Various Authors, Set to Music by Rouget de Lisle' (1826); etc., but is chiefly remembered as the author of both the words and music of 'The Marseillaise' (q.v.).

Rougon-Macquart, roo-gôn māk-kār, **Les**, a series of 20 novels by Emile Zola, relating the history of a family under the Second Empire and published 1871-93. The novels were intended to form a scientific study of heredity as well as a photograph of French social life. The series begins with 'La Fortune des Rougons' (1871), and this was followed by 'La Curée' (Rush for the Spoil: 1872); a study of the financial world of Paris at the time Haussmann laid out the boulevards; 'La Conquête des Plassans' (1874); 'Le Ventre de Paris' (The Markets of Paris; or Fat and Thin: 1875); 'La Faute de l'Abbé Mouret' (1875); 'Son Excellence Eugène Rougon' (1876), a story of political life; 'L'Assomoir' (Drink: 1877), a story of life among the workmen of Paris; 'Une Page d'Amour' (1878), a physical and psychological study of the various phases of a woman's passion; 'Nana' (1880), a study of the life of a courtesan and actress; 'Pot-Bouille' (1882), a study of the life of the bourgeoisie; 'Au Bonheur des Dames' (The Ladies' Paradise: 1883), a study of the mammoth de-

partment stores; 'La Joie de Vivre' (1884); 'Germinal' (Master and Man: 1885), a study of life in the mines; 'L'Œuvre' (1886), a study of artist life; 'La Terre' (1888), a study of peasant life and the greed for land; 'Le Rêve' (1888); 'Le Bête Humaine' (1890), a study of railway life; 'L'Argent' (1891), a study of stock speculation; 'La Débâcle' (The Downfall: 1892), a study of the Franco-Prussian war and the Siege of Paris; 'Le Docteur Pascal' (1892). In this last story Pascal Rougon collects all the data relating to his family, and sums up their history.

Rouher, Eugène, è-zhân roo-âr, French statesman: b. Riom 30 Nov. 1814; d. Paris 3 Feb. 1884. He studied law and practised his profession in Riom until his election to the Legislative Assembly in 1849. He became a confidant of Napoleon III. and was appointed minister of justice. In 1863 he was made minister of state, and in 1870 became president of the Senate and chief of the Napoleonic cabinet. In 1860 the famous treaty with England was effected largely through his instrumentality in which the free trade policy of Napoleon was inaugurated. His activity in state affairs continued until the fall of the empire when he fled from France. In 1872 he returned as the Corsican representative in the Assembly, and remained in office until 1875. He was to the last the leader of the Bonapartists.

Roulers, roo-lâ (Flem. *Rousselaere*), Belgium, on the Mandel, 17 miles south of Bruges, carries on an active industry in the manufacture of textiles, and a trade in linen, chicory, etc. Pop. about 25,000.

Roulette, roo-lêt, a French game of chance, in which a small ivory ball is thrown off by a revolving disk into one of 37 or 38 compartments surrounding it, and numbered from 1 to 36, with one or two zeros. Players who have staked upon the number of the compartment into which the ball falls receive 36 times their stake; less if they have staked upon more than one number. There are also other chances on which stakes may be placed.

Roumania, a variant spelling of RUMANIA (q.v.).

Roumanille, roo-mâ-nêl-ê, Joseph, modern Provençal poet: b. Saint-Remy, near Avignon, 1818. He was the first French poet to conceive the idea of reviving, as a literary tongue, the local dialects of southeastern France. Accordingly he gathered round him an enthusiastic band of friends, and with their assistance collected materials for a grammar and lexicon and also founded a consistent system of orthography. It was in his programme to produce, and favor the production of, genuine poetry, such as would speak to the hearts of the peasantry to whom this dialect was vernacular. In 1852 he edited a collection of Provençal poems by several authors under the title 'Li Provençalo.' It was mainly under his inspiration that the society of the 'Felibres' was formed, and he was the second president of its consistory.

Round, William Marshall Fitts, American journalist and reformer: b. Pawtucket, R. I., 26 March 1845; d. Achusnet, Mass., 2 Jan. 1906. He was educated at Harvard, became a journalist

and engaged actively in prison reform. He had served as United States delegate to various European prison congresses, was director and corresponding secretary of the National Prison Association, which he reorganized, and he also organized the Burnham Industrial Farm at Canaan, N. Y. He was the originator of the 'Mill' system of awards, now used in many institutions both at home and abroad, and was editor of 'Lend-a-Hand Record.' He wrote 'Achsa' (1877); 'Child Marian Abroad' (1880); 'Rosecraft' (1884); 'Torn and Mended' (1885).

Round, a short, simple musical composition, written generally for three or more voices on the same clef. Each voice takes up the melody after the first has sung the first phrase or so, the third following the second, as it followed the first, and so on, until after a certain number of repetitions the signal is given to stop. It is evident that the melody must be so constructed that each phrase must harmonize with the other, so that, when all the voices are singing, a three- or four-part harmony is heard.

Round Robin, a written protest or remonstrance, signed in a circular form by several persons, so that no name shall be obliged to head the list. This method of bringing grievances to the notice of superiors was first used by French officers, whence its derivation from *ronde ruban*, 'round ribbon.'

Round Table, The. See ARTHURIAN LEGENDS.

Round Towers. See TOWERS.

Roundabout Papers, The, the title of a work by William Makepeace Thackeray. He became editor of the 'Cornhill Magazine' in 1859 and 'The Roundabout Papers' were sketches for this periodical. They appeared simultaneously, between 1859 and 1863, with 'Love the Widower' and 'The Adventures of Philip,' and represent the author's best qualities as an essayist.

Roun'delay. (1) A song of any sort in which a line, refrain, or idea is constantly repeated. (2) The tune of such a song. (3) A dance in a circle. (4) Specifically, a fixed verse-form, originating in France, and better known as the rondeau (q.v.).

Rounders, a game played with a bat and a ball by two parties or sides, on a piece of ground marked off into a square or circle or pentagon, with a batter's station, and three (or more) goals or bases at equal distances. On the ball being thrown toward him the batter tries to drive it away as far as he can and run completely round the goals, or over any one of the four parts, before the ball can be thrown back to the batting station. The batter is declared out if he fails to secure a run after having had three balls, if a fielder returns the ball so as to strike him while running, or if the ball from his bat is caught in the air by one of the fielders. See BASEBALL.

Roundfish. See WHITEFISH.

Roundworms, or Thread-worms, worms of the phylum *Nemathelminthes* (q.v.); so called because of their elongated and cylindrical form. They are separable into three classes: (1)

Nematoda, or roundworms, strictly speaking; (2) *Acanthocephala*, the hook-headed or spiny-headed worms; and (3) *Chatognatha*, the arrow-worms,—a small class of obscure pelagic organisms. The most celebrated of the nematodes is the common roundworm (*Ascaris lumbricoides*), which infests the human intestines, especially in the case of children, who are said to "have worms." These parasites look like earthworms, are 5 to 15 inches long in the grown female, and a quarter of an inch thick, yellowish, with a dorsal and ventral white line, and two brown lateral lines. The three-lobed mouth is terminal at the anterior end, and the anus near the pointed "tail," which varies in form with the sexes. The organization is complicated, and the sexes are always separate, and the males always the smaller. The eggs are produced at the rate of several thousands a day. After fertilization they are enclosed in a tough shell, and are voided by the host with the feces. How the worm gains access to the human intestine is not precisely known. "It is possible," say Parker and Haswell, "that the eggs containing developing embryos, or the embryos themselves, after liberation from the egg-shell, may be taken in by drinking, without previous filtering, water into which fecal matter has been discharged. On the other hand it is quite possible that there may be an intermediate host, such as . . . occurs in several members of the class." Aside from occasional inflammations of the intestine, and obstruction of the bowel from their clumping, they cause no great harm, and various medicines, called vermifuges, expel them. Other species inhabit the intestines of the pig, the horse, the frog, etc. The last named (*A. nigrovenosa*) is remarkable in being hermaphroditic, and for its life-cycle. It begins by the worm entering from the water the mouth of a frog and making its way into the lungs, where it resides long enough in a hermaphroditic condition to produce eggs. These hatch and the embryos cut their way through to the enteric canal, where they escape with the feces. Then they develop into a mature form (*rhabditis*) in which the sexes are separate; in this the fertilized eggs develop in the body of the female, and when fully formed make their way through the walls of the uterus and proceed to devour the whole substance of the mother, leaving only the cuticle. Gaining their freedom they exist in the mud until taken into some frog's mouth, and a new cycle is begun. This is the form of alternate generations called heterogeny—the alternation of a hermaphroditic with a dioecious form.

Closely related to this are various parasitic nematodes, of which one is the thread-worm (*Oxyuris vermicularis*), or "pin-worm," which infests the rectum or lower bowel of children particularly, and gives rise to distressing symptoms, chief of which is an intolerable itching. Its length averages a quarter of an inch; and occasionally inflammation results from their presence in large numbers.

The eel-worms (*Gordius*), guinea-worms, vinegar-eels and similar more or less dreadful parasites also belong here, the worst of which, perhaps, is the trichina.

The class *Acanthocephala*, or spiny-headed

worms, includes a few genera of parasitic worms of which *Echinorynchus* is chief. Most are minute, but *E. gigas*, affecting the pig, may be 12 to 18 inches long; few other cases of their affecting mammals are known, the majority of species infesting inferior animals. These worms have at the head a protrusile proboscis, covered with rings of recurved hooks, which is buried in the wall of the intestine of the host, enabling the worm to hold its place. The development is complicated. The embryos escape from the intestines of the host, and die unless they are swallowed by some creature suitable for the development, such as certain shrimps for the fish-parasites, and a beetle for *E. gigas* of the pig. Should this "intermediate host" be eaten by the fish or the pig the developing worm fixes itself in the intestine and matures. See EEL-WORM; FILARIASIS; GUINEA-WORM; PARASITISM; TRICHINOSIS. Consult: Parker and Haswell, 'Text-book of Zoology' (1897), and authorities cited under PARASITISM.

Rouquette, roo-két', **Adrien Emmanuel**, American Roman Catholic priest and author: b. New Orleans, La., 13 Feb. 1813; d. there 15 July 1887. He was educated in France, where he studied law, and was graduated from the University of Rennes in 1833. Returning to America he abandoned law for the priesthood and his cherished career as a missionary to the Choctaw Indians, among whom he had spent some years in his boyhood. In 1859 he established a mission in the Indian village at Bayou Lacombe, and thenceforth devoted his life to the Choctaw people, by whom he was greatly beloved. His writings include: 'Les Savanes, Poésies américaines' (1841); 'Poèmes patriotiques' (1860); 'Catherine Teghekwitha' (1873).

Rouses (rows'iz) **Point**, N. Y., village, port of entry, in Clinton County; on Lake Champlain, and on the Delaware & H., the Rutland, and the Grand Trunk R.R.'s; on the boundary between the United States and Canada; about 160 miles north by east of Albany and 21 miles north by east of Plattsburg. A railroad bridge about one mile in length spans the portion of the lake between the State of New York and Grand Isle, in Vermont. The village has steamer connections with the Lake Champlain ports, and by way of the lake and the Richelieu River with many places in Canada. Rouses Point receives a large part of the custom receipts of the Champlain district. In 1900 the imports were \$15,309,725 and the exports \$5,211,770. The manufactories are a large printing house, railroad repair shops, lumber mills, and machine shops. It has the Charbonneau Institute, a high school, public and parish schools, and two public libraries. Rouses Point was a noted locality in the discovery days, and at the time of the Revolution and the War of 1812. Just on the frontier, on an island, is Fort Montgomery. Pop. (1890) 1,856; (1900) 1,675; (1910) 1,638.

Rousseau, roo-sô, **Jean Baptiste**, French poet: b. Paris 6 April 1671; d. Brussels 17 March 1741. In 1701 he was admitted into the Academy of Inscriptions and Belles-lettres, and his lyric compositions procured him high reputation among the French literati; but his turn

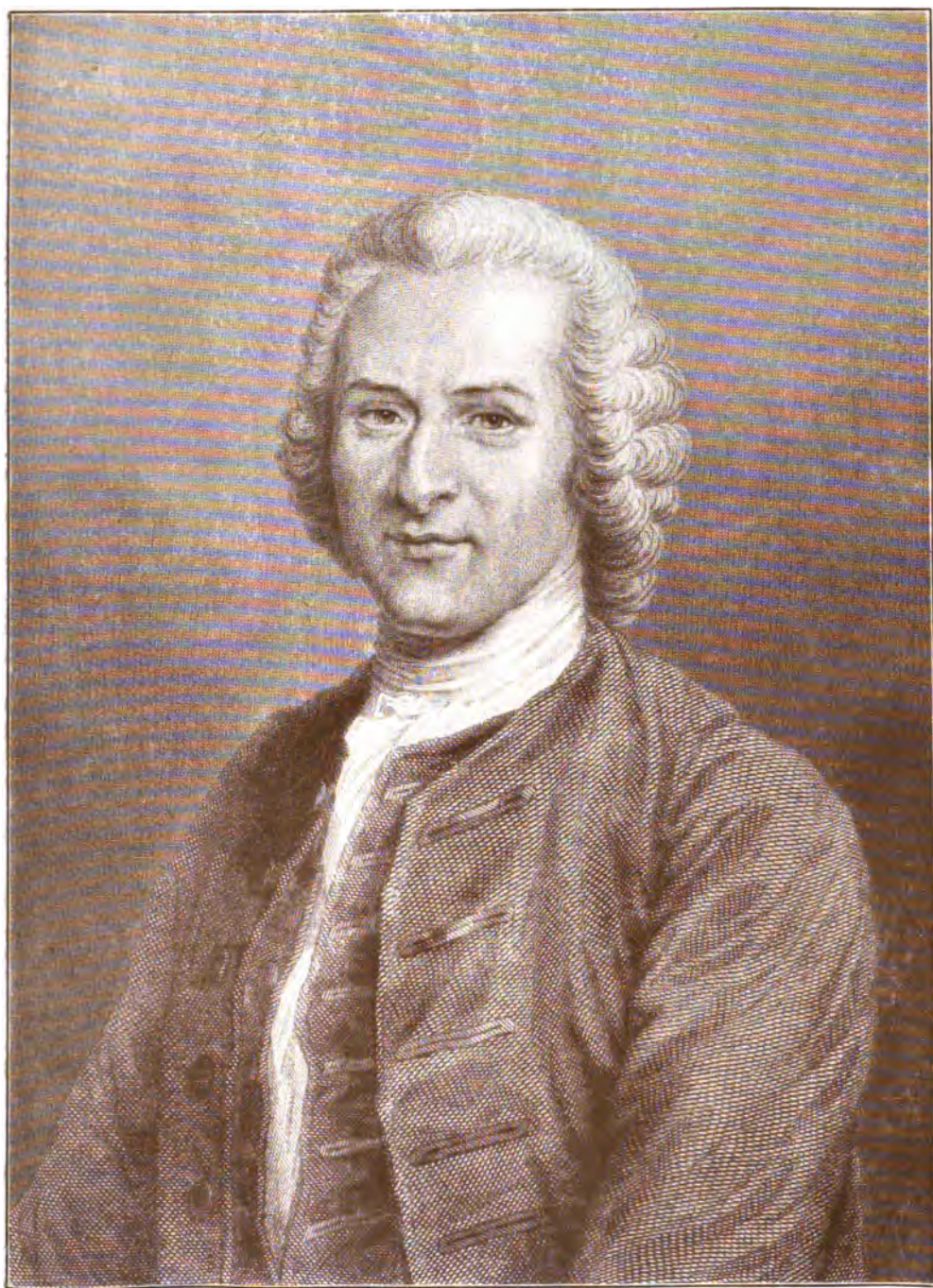
for satire and his quarrelsome temper at length involved him in disgrace. He was found guilty of having written against persons of consideration, and was exiled from France in 1712. The latter part of his life was spent in the Netherlands, where he obtained a pension from the Duke of Aremberg, which he resigned on having forfeited the favor of that nobleman. An edition of his works was published under his own inspection, by Tonson 1723, and since his death they have been often printed in various forms. One of the best editions is that of Amar, with a commentary and life of the author (1820). The same editor has also published his '*Euvres Poétiques*' with a commentary (1824).

Rousseau, Jean Jacques, zhōn zhāk, French author: b. Geneva, Switzerland, 28 June 1712; d. Ermenonville, near Paris, 2 July 1778. In 1726 he was articled to an engraver, whose severity disgusted him with his situation. He therefore ran away from his master, and after wandering for some days arrived at Conflignon, where he was received into the house of the curé of the village, and for some time hospitably treated. By this clergyman he was recommended to the notice of Madame de Warens, who sent him to a charitable institution in Turin, where he abjured Protestantism in favor of Catholicism. He left Turin to lead an unsettled existence. In the autumn of 1741 he went to Paris, where, under the recommendation of Réaumur, he read a paper before the Academy of Sciences on certain grand improvements he fancied he had made in musical notation. That body came to the conclusion that, though the improvements were ingenious, they were neither new nor practicable. He lived a very precarious life in the capital, without fixed abode or means of support, until appointed secretary to M. de Montaignu, French ambassador at Venice. After a residence of a year and a half in that city he quarreled with his harsh and avaricious chief, and returned to Paris in 1742, and there earned his living by copying music, employing his leisure hours in the study of natural science. About this time he became intimate with Diderot, Grimm, D'Holbach, and Madame d'Épinay. In 1750 he gained the prize offered by the Academy of Dijon, on the question whether the revival of learning has contributed to the improvement of morals, taking the negative side of the question, it is said, at the suggestion of Diderot. He soon after brought out his '*Devin du Village*,' a comic opera, of which he had himself composed the music. This piece was received with general favor, and the author was almost worshipped by the French; but the appearance of his celebrated '*Letter on French Music*' (1753), in which he pointed out its defects, excited a general storm. Singers and connoisseurs who could not wield the pen contributed to spread calumnies, pasquinades, and caricatures against the author, who retired to Geneva. By his change of religion he had lost the rights of a citizen. He now again embraced Protestantism, and was formally reinstated in the privileges of a free citizen of Geneva. From Geneva Rousseau went to the Hermitage, a retreat near Paris, provided for

him by Madame d'Épinay (1756), but the next year quitted the Hermitage and returned to Paris; and fixing himself at Montmorency, finished his '*Contrat Social*,' his '*Julie, ou la Nouvelle Héloïse*,' and his '*Émile*.'

His celebrated work on education, '*Émile, ou de l'Éducation*' (1762) was condemned by the Parliament of Paris on account of its religious views, and he himself sentenced to imprisonment. He wished to retire to Geneva, but was also threatened with imprisonment there, and his book was burned by the common hangman. He therefore took refuge in Moitiers-Travers, a small village of the Prussian province of Neuchâtel, where he again found himself among Protestants, the simplicity of whose worship was agreeable to him. Here, too, he obtained a protector and friend in the person of Marshal Keith, governor of the province, but the intrigues of his enemies pursued him even hither. The Geneva clergy assailed him from their pulpits, and he wrote his celebrated '*Letters from the Mountains*' in reply to their attacks. This work, with his '*Letter to the Archbishop of Paris*,' and his '*Dictionnaire Physique Portatif*,' were publicly burned in Paris in 1765. New troubles drove him from Moitiers, and he resided two months on Peter's Island, in the Lake of Biennne. His residence here produced his '*Botaniste sans Maître*.' Neither was he long tolerated here; the authorities of Berne ordered him to quit the country without delay in the severest season of the year. On reaching Paris he became the object of ridicule to the philosophers, but was kindly received by Hume, whom he accompanied to England; but yielding to his unfounded suspicions of his friends in England he left the country, and returned to Paris in 1767. In 1768 he published his '*Musical Dictionary*,' and soon after appeared his melodrama of '*Pygmalion*.' In May 1778, he retired to Ermenonville. The principal traits of Rousseau's character were an enthusiastic passion for love and freedom, a spirit of paradox, an inflexible obstinacy, and a warm zeal for the good of men, combined with a gloomy hypochondria. His influence was great in Europe, particularly in France, where it contributed toward the Revolution. There are standard editions of his works by Augius (1822) and Musset-Pathay (1823-6). Consult also Rousseau's own '*Confessions*'; de Rothschild, '*Letters Inédites de J. J. Rousseau*' (1892); and the '*Lives*' in French by Girardin (1875) and Chuquet (1893), and in English by Morley (1873).

Rousseau, Lovell Harrison, American soldier and legislator: b. Stanford, Ky., 4 Aug. 1818; d. New Orleans 7 Jan. 1869. He was admitted to the bar in 1841, engaged in practice at Bloomfield, Ind., and was a member of the Indiana legislature 1844-5. He served in the Mexican War and in 1849 opened a law office in Kentucky, and became famous as a criminal lawyer. In 1860 he entered the Kentucky senate, but resigned to join the Union army. He was commissioned brigadier-general of volunteers in 1861, promoted major-general in 1862, and fought at Stone River, Chickamauga and Chattanooga. From 1863-5 he was in command of the district of Tennessee and successfully



JEAN JACQUES ROUSSEAU.

defended Fort Rosecrans during the siege of Nashville. He took his seat in Congress in 1865, but in the following year resigned it in consequence of being reprimanded by that body for a public assault upon Representative Grinnell of Iowa. He was, however, soon re-elected and served another year. In 1867 he was appointed brigadier-general in the regular army and assigned officially to receive Alaska from Russia and assume control of the territory. He was summoned from this post to testify in the trial for impeachment of President Johnson and was afterward until his death in command of the Department of the Gulf with headquarters at New Orleans.

Rousseau, Pierre Etienne Théodore, French painter: b. Paris 15 April 1812; d. Barbizon, near Fontainebleau, 22 Dec. 1867. He was a pupil of Rémond (1826) and of Lethière, but quickly parted company with all current theories of art, and showed himself an original interpreter of nature, while he fought the battle of the new landscape—"paysage intime"—through the 13 years during which his pictures were excluded from the Salon by the Academic Jury, which has since then been happily abolished. He traveled through the Auvergne and Normandy and painted the scenery with the main object of breathing human feeling into the colors and forms of external nature. He is the central figure of the Barbizon school and must be looked upon as the founder of the modern school of French landscape painting, as opposed to the Romanticism of Claude Lorraine, Poussin and their followers. It has been well said of him: "He occupied the highest place because he was the most perfect master. The grand aspect of landscape and its tenderness are equally familiar to him. He renders with the same mastery the smile of creation and its terrors; the broad open plain and the mysterious forest; the limpid, sun-bright sky or the heaping of the clouds put to flight by storms; the terrible aspect of landscape or those replete with grace. He has understood all, rendered all, with equal genius. The greatest contemporary painters have each a particular stamp, Corot painting the grace; Millet, the hidden voice; Jules Dupré, the majestic strength. Théodore Rousseau has been by turns as much a poet as Corot, as melancholy as Millet, as awful as Dupré; he is the most complete, for he embraces landscape art absolutely."

In 1848 he took up his residence on the edge of the forest of Fontainebleau and derived most of his inspiration from the surrounding scenery. How he drew the motif of his work from this environment is seen in the fine picture in the Metropolitan Museum, New York, 'Edge of the Woods.' Among other characteristic works may be mentioned: 'View of the Valley of Paris and the Banks of the Seine'; 'The Forest Height of Compiègne' (1833); 'Avenue of Isle-Adam'; 'Entrance to the Forest of Fontainebleau' (1862); and 'Marsh in the Landes' (1854); the last two being in the Louvre. His early style was sketchy with some carelessness of touch, although absolutely sincere and impressionistic. Latterly he indulged in excessive detail,

and never seemed to know when his pictures were finished, but all his landscapes were tinged with the deepest poetic spirit. Yet he never really won recognition during his lifetime, and after an unsuccessful auction sale of his works in 1861 thought seriously of seeking a home in some foreign capital. It is said that the sense of this depreciation wore away his health. Yet in the last year of his life he took the medal of honor and since his death the genuine merit of his pictures has been acknowledged and as early as 1873 his 'Scene near Fontainebleau' was sold for \$2,360. Consult: Sensier, 'Souvenirs de Théodore Rousseau' (1872).

Rove-beetles, or Cocktails, names applied to a tribe of Beetles, the *Staphylinidae*, characterized by elytra only about one fourth of the length of the abdomen. A common species is the "Devil's Coach-horse," (*Goërius olens*), a fanciful name given to it from its diabolical aspect when it curls up the abdomen and opens its jaws. These beetles are carnivorous in habits, and are apt to bite if incautiously handled. The habit of cocking the tail has been alleged to have for its object the function of pushing the hinder wings under the short elytra, which are formed by the front wings and which protect the hinder or functional wings. These beetles fly about chiefly in the dusk and at night. The tarsi generally possess five joints.

Rovuma, rō-voo'mā, a river of Africa, which rises east of and near Lake Nyassa, and flows east into the Indian Ocean. It forms the boundary between German East Africa and Portuguese East Africa. It is about 500 miles long. For about 80 miles from the mouth, there are high lands along the banks, and about 160 miles from the ocean are a number of beautiful cascades and waterfalls. The river is navigable for some distance.

Rowan, rō'an, Andrew Summers, American army officer: b. Gap Mills, Va., 1859. He was graduated from West Point in 1881 and after the opening of the Spanish-American war in 1898 was sent to communicate with General Garcia. He made a landing from an open boat near Turquino Peak, Cuba, on 24 April 1898, and with much difficulty succeeded in reaching Garcia, obtained full information of the insurgent army, and made the return trip successfully. He was promoted 1st lieutenant, U. S. A., for this service, and in 1899-1902 was on duty in the Viscayas Group, Philippine Islands. He has since been professor of military science and tactics at the Kansas State Agricultural College. He has written 'The Island of Cuba' (1898).

Rowan, Stephen Clegg, American naval officer: b. near Dublin, Ireland, 25 Dec. 1808; d. Washington, D. C., 31 March 1890. He came to the United States when very young and in 1826 was appointed a midshipman in the navy, receiving promotion to lieutenant in 1837. He saw active service in the Mexican War and in 1855 he was appointed commander. At the outbreak of the Civil War he was in charge of the Pawnee, and on 25 May he engaged in the attack on the Confederate batteries at Aquia Creek, the first naval engagement of the War. He assisted in the capture of Fort Hatteras and was promoted captain and commodore for

ROWBOTHAM — ROWING

his services. He was engaged at Roanoke Island and Albemarle Sound, and later captured Fort Mason, thereby restoring National authority in North Carolina. He was in command of the New Ironsides at Forts Wagner, Gregg, and Moultrie, received the thanks of Congress, and in 1866 was promoted rear-admiral. He became vice-admiral in 1870, and from 1883 until his retirement in 1889 was chairman of the light-house board.

Rowbotham, rō'bōt-ām, John Frederick, English Anglican clergyman, poet, and historian: b. Bradford, Yorkshire, 18 April 1859. He was educated at Oxford, traveled extensively on the continent, and took orders in the Church of England in 1891. He was vicar of Ratley in 1892, rector of Huntley in 1895, British chaplain of Budapest and Hungary in 1896, and vicar of Abbotsley 1897-1900. He has published: 'The History of Music' (3 vols., 1887); 'Poetical Works' (1889-90); 'The History of the Troubadours and the Courts of Love' (1895); 'The God Horus, a Novel of Ancient Egypt' (1898); 'The Human Epic' (1902); etc.

Rowe, rō, George Fawcett, English-American actor: b. Exeter about 1829; d. New York 29 Aug. 1889. He made his first appearance on the stage in Australia in 1854; toured through India, China, and Peru, and appeared in New York in 1866 under Mrs. John Wood's management at the Olympic. His most famous part was Wilkins Micawber in Halliday's dramatization of 'David Copperfield.' He also played Silas Wegg in 'Our Mutual Friend,' and many other comic and farcical parts, some in pieces of his own composition, such as 'Brass'; 'The Geneva Cross'; 'Found Drowned'; and 'The Sleigh Bells.' His last appearance was at the Colosseum Theatre, London, as Rufus Potts in 'Forward to the Front,' 27 April 1889.

Rowe, Nicholas, English dramatic poet: b. Little Barford, Bedfordshire, 1674; d. 6 Dec. 1718. He studied at Westminster, entered a student at the Middle Temple; but turned his chief attention to literature. At 24 he produced his tragedy of the 'Ambitious Step-mother'; 'Tamerlane' followed in 1702. His next dramatic performance was the 'Fair Penitent,' remodeled from the 'Fatal Dowry' of Massinger. In 1704 he wrote 'The Biter,' a comedy, which being a failure, he thereafter kept to his own line, and from that time to 1715 produced his 'Ulysses,' 'Royal Convert,' 'Jane Shore,' and 'Lady Jane Grey.' On the accession of George I. in 1715 he was made poet-laureate. He wrote a few tender and pathetic ballads, translated Lucan's 'Pharsalia,' and edited the plays of Shakespeare (1709). The memoir prefixed to the plays contains much traditional matter judiciously presented.

Rowing, Mechanics of. Rowing is the method of propelling a boat by the use of oars. It consists of two parts—the stroke, and the feather, which are executed by a series of very complicated motions designed to apply a maximum of available motive energy in pushing the boat through the water, and at the same time insure the least amount of deviation from a straight course.

In preparing to row, the oarsman sits on the thwart, facing the stern and exactly opposite the handle of his oar, the loom of which

rests in the rowlock with the button on the inner side of the thowl pin. To obtain the maximum effect from the power exerted, he should sit about two inches from the after edge of the thwart, the body being held square and upright, the back straight and rigid, the feet pressed firmly against the opposite stretcher or foot board with the heels close together and the toes apart, so as to keep the knees separate. The handle of the oar should be held firmly by both hands which should be about three inches



FIG. 1.— Position beginning of stroke.

apart, with the outside one close to the end of the handle, the fingers being above and the thumb underneath. The grasp should be a flexible hold with the fingers and not a clutch with the whole hand. The forearms should be kept below the level of the handle, with the elbows down, close to the sides of the body. The wrists should be relaxed and dropped, so that the oars will lie flat upon the surface of the water.

The stroke is characterized by three distinct phases—the beginning, the pulling through, and finishing, and the 'recovery' which includes



FIG. 2.— Position half-way through stroke.

the "feather." In taking the stroke, the body is inclined forward, the backbone being kept straight and rigid, the chest thrown forward and held up as high as possible, while the stomach is kept well out and down between the legs. The arms should reach out perfectly straight from the shoulders to the wrists, and the action of the shoulder joints and the hips should be

ROWING

perfectly free and easy. In reaching forward, the oar handle is grasped firmly by the fingers, and the hands are shot out quickly straight from the body, and as soon as the oar has passed over the knees, the wrists are raised so as to bring the blade at right angles to the surface of the water and preparatory to dipping it, at the beginning of the stroke when the arms reach the extreme limit of their forward movement di-

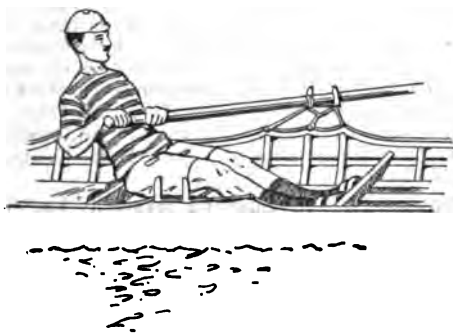


FIG. 3.—Position finishing of stroke.

rectly over the stretcher. At this instant, the hands are raised and the blade is dropped firmly into the water and buried until it is covered up to the shoulder. The stroke is pulled through by bracing the muscles of the back, loins, and shoulders, and by swinging the body backward, with the feet pressing hard against the stretcher, and the arms held perfectly rigid. The weight of the body is thus transferred from the seat to the stretcher and the handle of the oar, and when the body, in swinging backward, has reached a perpendicular position, the oar handle is pulled back home to the chest until the



FIG. 4.—The "Recovery." (Position of the hands and wrists in the act of feathering.)

knuckles almost touch the bottom of the breast bone, by the action of the shoulders and a gradual bending of the elbow joints, while the forearms are kept as nearly as possible in a horizontal position.

At the finish of the stroke, the whole strength of the arms and shoulders is exerted, but care is taken not to use the biceps, which if exerted, would tend to raise the arms and consequently bury the blade. At this point, the body is not allowed to "wait," but is continued to swing back until it is overtaken by the hands. When the hands reach the breast bone, they are dropped quickly about two inches so as to lift the blade out of the water, then turned back-

ward at the wrists until the knuckles touch the breast, so as to produce the "feather," in which the flat of the blade is made parallel with the surface of the water; then the arms are shot forward again close along the legs, accompanied by the forward swing of the body, in the "recovery." A quick recovery is effected by keeping the back straight and rigid, the knees not dropped too low, and by bracing the muscles of the body, and especially those of the stomach.

The operations of rowing from a fixed, or from a sliding seat, are very much the same. In the latter case, the stroke is taken by extending the arms to their full length, and swinging the body forward, simultaneously, with the assistance of the foot straps on the stretcher, the knees being kept slightly apart and the back straight. When the oar is dipped at the beginning of the stroke, the knees are straightened out gradually, and the body thrown backward, simultaneously, so that at the finish of the stroke, the legs are straight and the body and shoulders thrown well back. The recovery is effected by bringing the body to the upright position by the action of the hips, and then the motions described above are repeated in taking another stroke.

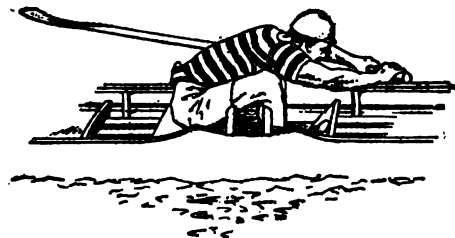


FIG. 5.—A common but very bad position. (Beginning of stroke.)

The motion of the body should be as constant and steady as that of a pendulum, while the action of the hands and the wrists, producing the dipping and the feathering, should be entirely free from jerks. When the boat contains a number of oarsmen, each one keeps his eyes on the back of the oarsman opposite to him, and times his swing from it, or in other words "keeps eyes in the boat." In governing his blade it is generally understood that the blade should be kept square or perpendicular to the surface of the water, but in properly constructed boats the thowl is slightly inclined aft, so that the blade is given a slight inclination forward, and presses against the water at an angle a little off the perpendicular. This obviates any tendency to row deep. On the other hand, if the thowl is inclined too much, the blade will have a tendency to fly out of the water.

A boat is "held" or has its headway stopped, by laying the blade flat and then sinking its forward edge slightly into the water. The blade is thus buried at an acute angle and checks the way of the boat gradually until it has been sufficiently reduced to allow of the blade being reversed square, to "back water." If the boat is under much headway, any attempt to back water before it has been held, would be attended with disastrous results, as the resistance would prove greater than the strength

ROWLAND — ROWTON HEATH

of the oarsman and make him catch a "crab" and throw him flat on his back, if it did not cause a fracture of the oar.

In sculling, a scull or oar is held in each hand, instead of one oar handle being held in both hands, as in rowing. The grip on the scull is governed by the rules applicable to the grip on the oar handle in rowing, but with the exception that, the thumb should cap the butt of the scull handle with the top joint and not clasp around it. The action of the body, legs, arms, wrists and hands, are also the same as in rowing, but, in sculling some advantage may be gained by allowing the body to swing farther back at the finish of each stroke. Both hands should work together, and both blades should enter and leave the water at the same time. It is obvious that if one hand lags behind the other in any one of these movements, the resulting uneven strokes would deflect the boat from a straight course.

W. MOREY, JR.,
Consulting Engineer.

Rowland, rō'land, Henry Augustus, American scientist: b. Honesdale, Pa., 27 Nov. 1848; d. Baltimore, Md., 16 April 1901. He was graduated from the Rensselaer Polytechnic Institute in 1870, and taught for a year in Wooster College, Ohio, but in 1872 returned to the Institute, where he was instructor in physics, becoming assistant professor in 1874. He studied for a time in Germany, and in 1876 accepted the chair of physics at Johns Hopkins University, which he occupied until his death. He was a member of the Electrical Commission in Paris in 1881, and was elected to the National Academy of Science in that year. He was the inventor of a greatly improved process of ruling large diffraction gratings directly on concave mirrors, constituting what is known as the dividing engine (q.v.), with which he succeeded in making photographs far superior to any which had then been made. He made numerous valuable investigations and experiments, particularly in electricity, among them an extremely accurate determination of the ohm, a work which he afterward extended under the government. He was author of more than 100 scientific papers and monographs, among which are: 'Magnetic Permeability' (1873); 'Magnetic Effect of Electric Connection' (1876); 'Research on the Absolute Unit of Electrical Resistance' (1878); 'On the Mechanical Equivalent of Heat' (1880); 'Photographs of the Normal Solar Spectrum' (seven plates, 1886); etc.

Rowlandson, rō'land-sōn, Mary White, American captive among the Indians. She was carried away by the Indians on the occasion of an attack on Lancaster, Mass., 10 Feb. 1675, during King Philip's war. For a time she was kept in an Indian village near the site of Petersham, Worcester County, and later was taken by her captors across the Connecticut, and after about three months was redeemed. Her 'True History' of her captivity and restoration was printed at Cambridge, New England, and in London, in 1682. A fifth edition was prepared by Joseph Willard (1828). The work, though not always clear as to detail, is interesting, and throws a graphic sidelight on Indian existence with its cruelty and squalor.

Rowlandson, Thomas, English artist: b. London July 1756; d. there 22 April 1827. He

was sent at 15 to Paris, and there studied art and gained a taste for pleasures of the town. The £7,000 left him by a French aunt he gambled away, yet he hated debt, and maintained his uprightness of character. He traveled over England and Wales, and enjoyed life to the full in his tavern and the company of friends like Morland, Gilray, and Bunbury. Rowlandson possessed rare dexterity of touch and fertility of imagination; and, though not seldom vulgar, he was never feeble. He was a relentless hater of Napoleon, belittling his greatness by countless travesties. Some of his best known works are his 'Imitations of Modern Drawings' (1784-8), and his illustrations to 'Syntax's Three Tours,' the 'Dance of Death,' Sterne's 'Sentimental Journey,' 'Peter Pindar,' the 'Bath Guide,' 'Munchausen,' etc.

Rowson, rō'sōn, Susanna Haswell, American actress and author: b. Portsmouth, England, 1762; d. Boston 2 March 1824. Her first work, the novel, 'Victoria,' appeared in England in 1786, and in 1792 she made her stage debut at Edinburgh. In 1793-6 she acted in the United States, closing at Boston with a comedy by herself, 'Americans in England.' From 1797 until her retirement in 1822 she conducted with much success a seminary for young ladies, first at Boston, and from 1800 at Medford. Her most popular work was 'Charlotte Temple, or a Tale of Truth' (1790), which had in its time wide sale, but is called by Wendell a "comically extravagant example" of a literary manner then much in favor. Further she wrote, among several volumes: 'The Inquisitor' (1788); 'The Volunteers' (1793); 'Miscellaneous Poems' (1804). There is a memoir by Nason (1870).

Rowton, row'tōn, Montagu William Lowry-Corry, 1ST BARON OF, English lawyer and philanthropist: b. 8 Oct. 1838; d. London 9 Nov. 1903. He was educated at Trinity College, Cambridge, became a barrister in 1863, and entered upon a successful career as a lawyer. He was secretary to the Earl of Beaconsfield in 1866-8 and in 1874-80, and was secretary of the special embassy sent to the Berlin congress in 1878. He was created a baron in 1880. He established the Rowton lodging houses in London some three years before the Mills Hotels were instituted in New York. They were built with the idea of furnishing decent and comfortable lodgings for workmen and furnishing them also with well-cooked and substantial food at very moderate rates, yet at the same time with the intention of keeping the enterprise on a paying basis. He was chairman of the Rowton Houses and of the Guinness Trust until his death.

Rowton Heath, England, a place near Chester, which was the scene of a battle 24 Sept. 1645, in which the Parliamentary forces defeated the Royalists. After the crushing disaster of Naseby, King Charles I. fled to Wales, and next formed the desperate project of marching north to Montrose. Chester was then being besieged by Sir William Brereton, but the king succeeded in finding an entrance, and charged Sir Marmaduke Langdale to raise the siege. The Parliamentarians had just been reinforced by Poyntz's Yorkshire horse when Sir Marmaduke attacked them. He was utterly defeated, with

ROXBURY—ROYAL GEORGE

a loss of 300 killed and 1,000 prisoners, and the disaster, added to Philiphaugh, stripped the unhappy king of his last hope.

Roxbury, rôks'bûr-î, Mass., now a part of the city of Boston, annexed in 1867. It has a diversified surface, a remarkable alternation of hills and hollows, which furnish opportunities for picturesque building sites, and which has made a great portion of Roxbury a residential section. There are a number of manufactories, among which are cotton and woolen mills, machine shops, cordage factories, carpet factories, and organ works. A free Latin school was established in Roxbury in 1645. The place was for many years the scene of the labors of John Eliot (q.v.), the "Apostle of the Indians," and his remains are in the "ministers' tomb" in the old burial ground. It is also the birthplace of Joseph Warren (q.v.) of Revolutionary fame. The township of West Roxbury, which contained the villages of West Roxbury and Jamaica Plain, was set off from Roxbury in 1852. When Roxbury was annexed to Boston it had a population of about 40,000.

Royal Academy of Arts, The. See **ACADEMY OF ARTS, THE ROYAL**.

Royal Academy of Music, London, England, an institution established in 1823, mainly through the exertions of Lord Burghersh (afterward Earl of Westmoreland), and incorporated by royal charter in 1830. The purpose for which it was founded was to afford a first-class musical education in the various branches of music, and to properly equip those who make music a profession. It receives a grant from the government, and from this and other sources is able to award to successful competitors a large number of scholarships and prizes. Instruction is given in musical composition, singing, and instrumental playing. Concerts are given at intervals by the pupils. Connected with the R.A.M. are associates, fellows, and licentiates, besides honorary members. Among its principals have been Sir George Macfarren and Sir A. C. Mackenzie.

Royal and Protestant Order of Saint John. See **ORDERS, ROYAL**.

Royal Arcanum, The, the name of one of the largest and strongest of the fraternal and beneficial societies in the United States. It was first organized 23 June 1877 at Boston, Mass., by Dr. Darius Wilson and John Andrew Cummings. The original council in Boston had but nine members. Other councils were soon established in the same city, and the order spread rapidly throughout the New England States. It has since grown at a rapid rate, and there are councils in every State and in almost every city and town in the Union. The business of the order is conducted in Boston, where the society owns a substantial building, in which the supreme council meets. The society is governed through councils which are dominated by the supreme council or governing body. The membership qualifications are good health and character; and the age limit is embraced in the ages between 21 and 55. Benefit certificates are issued for \$1,500 and \$3,000, payable at the death of a member. Should a member desire to increase his insurance over the limit fixed by the society he can do so by making application for the in-

crease in the Loyal Additional Benefit Association, formed in 1889, practically within the Royal Arcanum, and incorporated in 1890 under the State laws of New Jersey.

The officers of the supreme council or governing body of the society consist of supreme regent, supreme vice-regent, supreme orator, sitting past supreme regent, supreme secretary, supreme treasurer, supreme auditor, supreme chaplain, supreme warden, supreme sentry, and legal adviser. The grand councils and subordinate councils have a similar roster of officers.

The remarkable growth of membership in the Royal Arcanum is evidenced by the following official figures:

	Membership	Grand Councils	Subordinate Councils
1898.....	198,573	22	1,762
1902.....	249,644	27	2,004
1903.....	258,746	28	2,045

For the same period the total number of deaths in the order and the total amount of benefits paid were as follows:

	Number of Deaths	Amounts Paid
1898.....	16,479	\$47,886,199
1902.....	25,714	73,817,678
1903.....	27,480	76,190,352
Emergency fund 31 Oct. 1902.....		\$1,813,141
Emergency fund 28 Feb. 1903.....		\$1,885,786

The emblem of the association is a royal crown within a circle, on the circumference of which are 10 small Maltese crosses with the motto, "Virtue, Mercy, and Charity."

Royal Arch Masons. See **MASONIC FRATERNITY**.

Royal College of Music, London, England, an institution established in 1883 in South Kensington under the presidency of the Prince of Wales, afterward Edward VII. It was endowed at its commencement by gifts to the amount of \$630,000. Pupils of either sex are admitted either as fee-paying students or as scholars or exhibitioners. There are 52 open free scholarships and 11 close free scholarships, besides the council exhibitions, the Savage Club exhibition, the exhibitions of the associated board of the Royal Academy of Music (q.v.) and the Royal College of Music, etc. Prizes and medals are also awarded to the students in accordance with the results of examinations. The associateship may be obtained by outsiders as well as pupils on passing a qualifying examination, and entitles the holders to use the initials A.R.C.M. The professorial staff includes several eminent names.

Royal Crown of Hawaii, Order of. See **ORDERS, ROYAL**.

Royal Family, The, in its widest sense, as referring to Great Britain, embraces all the British descendants of the royal house; in its narrower sense it includes only the queen-consort and queen-dowager, with all the lineal descendants of the sovereign. The husband of a queen-regnant is not as such a member of the royal family. The members of the royal family have precedence before all peers and officers of state; but an heir-presumptive has no rank or precedence as such, as his position may be altered by the birth of an heir-apparent.

Royal Fern. See **OSMUNDA**.

Royal George, English man-of-war, sunk in Portsmouth harbor, England, 29 Aug. 1782.

ROYAL GEOGRAPHICAL SOCIETY — ROYALL

While undergoing repairs at the keel the vessel suddenly careened and filled with water, going down with all on board. The ship, the principal vessel of Lord Howe's fleet, was commanded by Admiral Kempenfeldt, and carried about 1,100 persons, including nearly 300 women and children. The disaster was commemorated in an elegy by Cowper, 'The Loss of the Royal George.' The first attempt to raise the vessel was made in 1817; but it was not until 1839 that portions of the ship and its cargo were brought to the surface, when the sunken mass was exploded by means of great quantities of gunpowder.

Royal Geographical Society. See GEOGRAPHICAL SOCIETY, ROYAL.

Royal Institution of Great Britain, an institution founded in 1799 by Count Rumford, Sir Joseph Banks, and other men of science, and incorporated in 1800. It was reconstituted on a wider basis in 1810, and has for objects the promotion of scientific and literary research, the teaching of the principles of experimental science, the exhibition of the applications of these principles to the arts, and the affording of opportunities for study. Many distinguished chemists and physicists have conducted their researches in the laboratories. The library contains some 60,000 volumes.

Royal Lion, Order of. See ORDERS, ROYAL.

Royal Louis Order, The. See ORDERS, ROYAL.

Royal Observatory, Greenwich, the famous English observatory founded by Charles II. in 1675. The first observation was made 19 Sept. 1675. The director of the observatory is styled the astronomer royal, and is under the official control of the admiralty, but receives his appointment directly from the prime minister, and holds office by warrant under the royal sign manual. The largest instrument is a 28-inch refractor, with a spectroscope attached which has been recently mounted. Photographs of the sun are taken on every available day, and after being measured are carefully stored for reference. Magnetic and meteorological observations, made continuously, form an important branch of the works. The chronometers used in the English navy are purchased, and generally examined at the observatory. Hourly and daily time-signals are sent out from the observatory through the post-office telegraphs giving Greenwich time to all parts of the country.

Royal Order of Victoria. See ORDERS, ROYAL.

Royal Orders. See ORDERS (ROYAL) AND DECORATIONS OF HONOR.

Royal Society of Edinburgh, a society which was incorporated in 1783, having been developed from the Philosophical Society of Edinburgh, commenced in 1739. Among its early members were Hume, Reid, Edmund Burke, Hutten, Dugald Stewart, and James Watt; and among its presidents have been Sir Walter Scott, Sir David Brewster, the Duke of Argyll, Lord Moncrieff, and Sir William Thomson.

Royal Society, London, an organization which owes its origin to a club of learned men who were in the habit of holding weekly meet-

ings in London as early as 1645, but the year 1660 is generally given as the year of its foundation. Charles II. took much interest in the proceedings of the society, and in 1682 granted a charter to the "President, Council, and Fellows of the Royal Society of London for Improving Natural Knowledge." Lord Brouncker was first president of this incorporated Royal Society. Meetings are held weekly from November to June for the purpose of reading and discussing scientific papers; and the more important of these are published in the annual 'Philosophical Transactions,' first issued in 1665, and now forming a most valuable series. Accounts of the ordinary meetings, with abstracts of papers, etc., appear also in the periodical 'Proceedings,' begun in 1800. Scientific research has at all times been both initiated and encouraged by the Royal Society, and many of the most important scientific achievements and discoveries have been due to its enlightened methods. It deservedly enjoys an influential and semi-official position as the scientific adviser of the British government, and not only administers the \$20,000 annually voted by parliament for scientific purposes, but has given suggestions and advice which have borne valuable fruit, from the voyage of Captain Cook in the *Endeavour* in 1768 down to the Challenger expedition, more than a century later. The society has an independent income.

Royal University of Ireland, an examining institution with its seat at Earlsfort Terrace, Dublin. It was founded in 1880 in pursuance of the provisions of the University Education (Ireland) Act, 1879, to take the place of the Queen's University, a similar institution established in connection with the Queen's Colleges (q.v.). The Royal University corporation consists of a chancellor, a senate, and graduates, the government being vested in the chancellor and senators, the latter not to exceed 36 in number. It has power to confer all such degrees and distinctions as are conferred by any university in the United Kingdom except in theology; these may be bestowed on all male and female students who have matriculated in the university and passed the prescribed examinations, no residence in any college or attendance at any course of instruction in the university being obligatory on any candidate for a degree other than a degree in medicine or surgery, the university in this respect resembling that of London. An act of 1881 provided for the payment of \$100,000 a year out of the surplus funds of the Irish Church for the purposes of the university. The university has a considerable staff of examiners, but no professors. A certain number of exhibitions and scholarships are conferred on those who pass examinations with high distinction.

Royall, roi'al, Isaac, American soldier: b. Massachusetts about 1720; d. England October 1781. He was a wealthy citizen of Medford, was its representative for many years in the general court, and for 21 years was a member of the executive council. He served in the French war, and in 1761 was appointed brigadier-general, the first resident of New England to attain that rank. At the outbreak of the American Revolution he remained loyal to the crown, and in 1775 left the country. His estates were confiscated and he was proscribed in 1778, but seems to have borne no enmity to his native land.

ROYCE — RUBBER MANUFACTURES

as he bequeathed 2,000 acres of land in Worcester County to found a law professorship at Harvard, and made various other patriotic bequests. The town of Royalston, of which he was one of the original proprietors, was named in his honor, and the chair of law was established in his name at Harvard in 1815.

Royce, rois, Josiah, American philosopher and educator: b. Grass Valley, Nevada County, Cal., 20 Nov. 1855. Graduated (1875) from the University of California, he studied also at Leipsic and Göttingen (1876) and the Johns Hopkins University (1877-8), and in 1878-82 was instructor in English in the University of California. From 1882 to 1885 he was instructor in philosophy at Harvard, in 1885 was appointed assistant professor, and in 1892 was elected to the professorship of the history of philosophy, which he still retains. His views are very similar to those of T. H. Green (q.v.), the great English representative of the Neo-Kantian or Neo-Hegelian movement, and his position may be studied in the historico-critical work, 'The Spirit of Modern Philosophy' (1892). His clear, distinguished style as writer and lecturer has served to enhance his reputation in the United States, among whose leaders in philosophic inquiry he is highly ranked. Besides 'California from the Conquest to the Vigilance Committee of 1856' (1886), and 'The Feud of Oakfield Creek' (1887), a work of fiction, he has written: 'A Primer of Logical Analysis' (1881); 'The Religious Aspect of Philosophy' (1885); 'The Conception of God' (1897); 'Studies of Good and Evil' (1898); 'The Conception of Immortality' (1900; Ingersoll lecture on immortality, 1899); 'The World and the Individual' (1900-1; Gifford lectures, 1899-1900); 'Outlines of Psychology' (1903).

Roycrofters, roi'kröf-têrz, **The**, the name applied to a colony of artisans and artists living at East Aurora, Erie County, N. Y. The founder of the Roycroft colony was Elbert Hubbard (q.v.), who in 1893 established here a printing establishment and a monthly periodical called 'The Philistine.' Hubbard, imbued with a socialistic doctrine similar to that of William Morris (q.v.) of England, gradually gathered about him numerous kindred spirits, and since 1900 the Roycrofters have been producing hand-made books, furniture, and wrought-iron work, and have established schools of music, painting, and sculpture. There are numerous workshops, a library, church and other buildings at East Aurora, occupied by the Roycrofters, who have increased in number until the colony numbers several hundred.

Royer-Collard, rwä-yä-kö-lär, Pierre-Paul, French statesman and philosopher: b. Sompuis, Marne, 21 June 1763; d. Chateaufvieux 4 Sept. 1845. He was educated at the colleges of Chaumont and Saint Omer, and later became an advocate in Paris. He was an active participant in the pre-Revolutionary movement, and was elected one of the representatives of the commune of Paris. During the ascendancy of the Jacobins he retired to his native province, where he succeeded in avoiding their suspicions. In 1797 the department of Marne sent him to Paris as a member of the Council of the Five Hundred, and there he endeavored to serve the republic. But his sympathies were not with the Napoleonic

regime. His correspondence with Louis XVIII. began at this period, which was also marked by his temporary retirement from political life. In 1809 he was appointed to the chair of philosophy in the University of France, and later became known as the head of the "doctrinaire" school. At the Bourbon restoration in 1814 he was made councillor of state, and chief of public instruction. In 1827 he was admitted to the French Academy, and in 1828 became president of the chamber of deputies. In 1842 he retired from public life. He left few published works, but these reveal him as at all times on the side of freedom and enlightenment. In the support of the house of Bourbon he sought the overthrow of an empire which seemed to him to have usurped greater privileges than those of the monarchy it supplanted. His biography has been written by Barante (1878), Spuller (1895), and Vingtain (1858). For an outline of his philosophy, consult Jouffroy's translation of Reid.

Roze, röz, Marie, French opera singer: b. Paris 2 March 1850. She was a favorite opera singer of Paris for many years. Her first appearance in London was in 1872. There she was received with favor also, and sang in Italian opera during the next four years. She was married to Mr. Mapleson, her manager, in 1897, and sang for two years in America, when she returned to the London operatic stage.

Ruatan, roo-ä-tän', or Roatan, rō-ä-tän', an island of Central America, in the Bay of Honduras, is 30 miles long by 10 miles wide. Its coast has dangerous reefs, except at the south, where there are a few good roadsteads, and at the east, where there is one, called Port Royal, which is ample and deep, though difficult of access. The soil is fertile and the cocoa-palm, figs, and vines grow spontaneously, while all vegetable growth is abundant. Ruatan has three dependencies, Bonaca, Utila, and Barbareta, comprising the colony of the Bay Islands. These islands were ceded to Honduras in 1856 by Great Britain. Pop. from 2,000 to 4,000.

Rubaiyat, roo'bäi-yät, a Persian word, the plural of *rubai*, signifying quatrain or epigram. Various forms of the *rubai* were borrowed from the Arabic, and one specific form was invented by Abul Khair of Mahna. It is this style of *rubai*, affording the most concise expression to views of religion and philosophy, that was developed by Omar Khayyam (q.v.), a selection of whose quatrains, translated into English by Edward Fitzgerald (q.v.), became so widely known as popularly to be called 'The Rubaiyat.'

Rubber. See INDIA RUBBER.

Rubber Manufactures, American. The rubber industry in the United States began with the discovery of the process of vulcanization in 1840. It had been used by the South American natives before the discovery of America. It was not until 1770, however, that rubber was utilized in any civilized country; then a few pieces of it were sent to England to be used by artists for erasing pencil-marks. The first rubber imported into this country, in 1800, came in the form of bottles, and was looked upon simply as an interesting curiosity. During the next 20 years sea-captains coming from South American countries were constantly bringing with them specimens of "gum elastic," as it was then more generally

RUBBER MANUFACTURES

called, simply as the strange product of a distant land. In 1813 a patent was granted Jacob Hummel, of Philadelphia, for a gum-elastic varnish, of which there seems to be no further mention. Some 10 years later, in 1823, a Boston sea-captain, coming from South American ports, brought with him a pair of rubber shoes which excited the greatest interest. In 1825 500 pairs of rubber shoes, made by the natives along the Amazon, were brought into Boston; they were thick, clumsy, and unshapely, but they sold readily, at \$3 to \$5 per pair; for, with all their heaviness and awkwardness, it was found that they were a secure protection against dampness. During the next 15 years probably over 1,000,000 pairs of these shoes were brought into this country and sold at these very considerable figures.

In 1831 it was discovered that by dissolving the crude rubber in spirits of turpentine and adding a quantity of lampblack there could be obtained a varnish which, when spread over leather or cloth, gave a hard, smooth, impervious surface. The Roxbury India-Rubber Company was organized and received its charter in 1833. Its business was prosperous, but was actually doomed to speedy failure as the preparation used was not durable, melting and sticking in summer and cracking in winter. Charles Goodyear, a bankrupt hardware merchant of Philadelphia, became interested in the method, and learning of its imperfection set himself to remedy the fault. By 1836 the Roxbury Company had ignominiously failed. After six years of experiment, in 1838 Goodyear found a solution of the difficulty. The story goes that as he was sitting by the kitchen stove descanting on the possibilities of rubber, he struck a handful of rubber and sulphur against the hot stove, thus accidentally discovering the secret of vulcanization.

In 1840 he secured the assistance of two New York capitalists and built a factory in Springfield, Mass. Here, four years later, he took out a patent for preparing rubber by the process of vulcanization, and began to sell licenses for the manufacture of various articles under this patent. The license to manufacture rubber boots and shoes was sold to Leverett Candee, of New Haven, the founder of L. Candee & Co., a company which has continued to the present time an important factor in the American rubber footwear industry. The license to manufacture rubber gloves he granted to the Goodyear's India-Rubber Glove Manufacturing Company, of Naugatuck, Conn. The license to manufacture door-springs, which seemed a very trivial branch of the industry, but which later grew to considerable proportions, was granted to Daniel Hodgman, of New York; and various other licenses were given out to different companies. All branches of the rubber business as we find it in this country to-day took their permanent rise from the date of Goodyear's patent. Mechanical goods, and especially belting, began at this time to receive considerable attention. Some rubber garments were also made. An immediate demand for the poncho—a blanket for horsemen, with a hole in the centre for the rider's head—came from the far Southwest and from Mexico; and various druggists' sundries also began to find their way into the market. With the discovery of hard rubber the field of rubber's usefulness was still further largely extended. But the importations of crude rubber

at Salem, Mass., to which port the greater part of the rubber then imported was brought, amounted in 1851 only to 334,000 pounds, in 1852 to 1,961,000 pounds, and in 1854 to 2,055,000 pounds.

The Civil War gave a great impetus to the rubber industry, notably to the clothing branch; blankets were needed for the soldiers, and the government gave out large contracts. The boot and shoe industry increased rapidly with the other branches of rubber manufacture, so that, from an output in 1860 of the value of \$795,000, the yearly output in 1870 had increased to \$8,000,000. The manufacture of mechanical goods took a rapid start shortly after the War. This was owing to a considerable extent to the great increase of railroad building at that time. The railroads called for large quantities of packing, and for hose to be used in conveying steam and gas. The impetus given to manufacturing in general made an increased demand for rubber belting. The first rubber belt was patented in this country in 1836, but this particular branch of the rubber industry reached no considerable size until after the War, when rubber belting was in demand for mills, factories, and elevators, and especially for all outdoor machinery. It possessed several advantages over leather belting: its lower price, the greater friction between the belt and the wheel, and the fact that it was not affected by exposure or by moisture. The making of rubber tires began in 1877, with the solid tire, which gave way to the cushion tire. It in a short time and in a less degree was displaced by the pneumatic tire. It is estimated that at least 3,000,000 pounds of rubber are now annually used in the making of bicycle tires, and twice as much more for tires for carriages, wagons, and automobiles. Next in importance to rubber tiring, which stands next to hose, belting, and packing, comes the making of rubber mats. This industry has enjoyed a constant and rapid growth, until we have mats for floors and for stairs, pitcher-mats for tables, and coin-mats for counters—and all in an infinite variety of design. Rubber tiles, which have recently come into use, are desirable not only because of their cleanliness and durability, but for their noiselessness. The introduction and rapid growth of the typewriter industry has consumed a constantly increasing quantity of rubbers in various details of typewriter construction. Several hundred thousand pounds of rubber are used each year by one company alone in the manufacture of rings for preserving jars. The making of pencil erasers consumes a large quantity, and there is a large annual output of goring, in which rubber thread is used. A quarter of a million dollars' worth of rubber is used in this country each year in the making of cushions for billiard-tables. Other important items are rubber stamps, tennis balls, footballs, golf-balls, etc. There are now about 40 companies making rubber mechanical goods, with an aggregate capital of about \$30,000,000, employing 10,000 men, and having an annual output valued at from \$35,000,000 to \$40,000,000. Our export trade in mechanical goods amounts to about \$2,000,000 a year.

The attempt to utilize the waterproof properties of the caoutchouc gum in the manufacture of clothing was one of the earliest directions which rubber invention took, especially in Eng-

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land. In this country very little was done in this department of rubber manufacture until the Civil War, and the great demand to which it gave rise for rubber coats and blankets. After the War rubber coats continued to be made, but they were chiefly of a heavy sort and almost solely for men. For women's use the light gossamer came out about 1875. But excessive competition resulted in such deterioration of quality as seriously to affect its popularity. About 1885 the manufacture of mackintoshes for both men and women was started in this country. About 20 factories, with a capital of more than \$6,000,000, manufacture mackintoshes. Another important branch of the rubber industry in the United States is the making of druggists' sundries. The pioneer in this industry was the Union Rubber Company, located in Harlem. It derived its license direct from Goodyear, and began to manufacture druggists' sundries in 1857, making syringes, water-bottles, bandages, air-pillows, and air-cushions. The atomizer was a later development, and came into vogue in 1880. There are some 10 companies engaged in this branch of the business in this country at the present time, with a capital of between \$4,000,000 and \$5,000,000, and with an annual output of about \$4,000,000. After Goodyear had brought his vulcanization process to a fair degree of perfection he turned his attention to the making of hard rubber, in which he was greatly assisted by his brother Nelson, who in the year 1851 obtained a patent for the production of hard rubber. Hard rubber differs from soft rubber in containing a much larger proportion of sulphur, and in the degree of heat used in vulcanization, which is considerably higher than that at which soft rubber is vulcanized. The first article made in hard rubber to any considerable extent was the comb. It is said that Goodyear's experiments in this line made his combs cost twenty times as much as the ivory combs then in use; but the rubber comb has now practically displaced all other kinds. For twenty years after the invention of hard rubber the India-Rubber Comb Company practically enjoyed its monopoly; but other companies entered the field after the expiration of the Goodyear patent. In 1868 the American Hard Rubber Company, with a capital of \$2,500,000, was formed, and absorbed the various individual companies engaged in this line of manufacture. The annual output of hard rubber goods is in the neighborhood of \$3,000,000, and about 2,500 operatives are employed in this branch of the rubber trade. The principal articles of manufacture are electrical appliances, combs, syringes and syringe fittings, fittings for pipes, buttons, harness trimmings, and various desk articles, such as ink-wells, penholders, and rulers. It is the boot and shoe industry, however, that has led in rubber manufacture in this country from the very first. For many years it used the great bulk of the rubber imported into this country; but the later development of other branches of the rubber business has been so large that now the boot and shoe industry comprises probably not over 40 per cent of the rubber manufactured in the United States. From an annual output in 1860 of the value of \$795,000, the value of the rubber boot and shoe product grew in 1870 to \$3,000,000, in 1880 to \$16,000,000, in 1890 to \$24,000,000, and in 1900 to \$40,000,000. There are now a dozen or more

large factories engaged in the manufacture of rubber boots and shoes. Their combined daily capacity is over 180,000 pairs of boots and shoes; they employ 17,000 workmen, and their aggregate capital is \$50,000,000. Their aggregate output for 1900 was 40,000,000 pairs of boots and shoes. We have as yet done comparatively little in the way of exporting rubber boots and shoes, our annual exports in this line rarely exceeding \$1,000,000. The reason has been chiefly that the American demand has been so large and has so constantly increased that our manufacturers have not yet felt the necessity of looking for a broader field. They have consequently made no effort to appeal to foreign buyers by making rubbers particularly suited to their local conditions. The rubbers which we export go chiefly to England, the Continent, Japan, and China. A very important event in the history of the rubber boot and shoe industry in the United States occurred in the fall of 1892, when the United States Rubber Company purchased nearly all of the large footwear interests in the United States. This centralization of the rubber industry has already resulted in conspicuous economies; for while the different factories have remained under their former individual management, they have shared their individual advantages in common, the patents and secret processes of one factory becoming the property of all. In this way all the improved methods, a part of which each factory enjoyed before, are now shared equally and fully by all the different factories. There has also been a great saving in the matter of purchasing crude rubber, a large single purchase being made at a great advantage over a number of smaller scattered purchases. In reducing the necessity of carrying large stocks, in diminishing the duplication of a vast number of expensive lasts, and in various other ways, marked economies have been effected, while at the same time the quality of the goods has been more uniformly excellent than heretofore. The combination of all that was best in the methods of the different companies has proved a potent agency in advancing the rubber footwear industry in this country toward the universal goal of all industrial enterprises—better product at a lower cost. The entire rubber industry in the United States, in its five branches, footwear, mechanical goods, clothing, druggists' sundries, and hard rubber, consumes considerably more than one half of the rubber manufactured in the world. The consumption of rubber in this country increased from 9,830,000 pounds in 1875 to 17,835,000 pounds in 1880, to 31,949,000 pounds in 1890, and to 50,000,000 pounds in 1900. To this large amount must be added the rubber which is obtained by the reclaiming process, which has now been brought to such a state of perfection that very little rubber goes to waste, old rubber articles being collected and subjected to a process which eliminates from the compound everything but the rubber. It is probable that the amount of this reclaimed rubber used annually in this country equals 40,000,000 pounds, making the total yearly consumption of rubber 90,000,000 pounds. The rubber industry in the United States in 1901 is 20 times what it was in 1860, five times what it was in 1870, and has trebled since 1880. There are \$100,000,000 of capital invested in the various branches of rubber manufacture in this country, and the value of the

RUBBER-TREES

yearly product is fully \$100,000,000, while 200,000 people depend upon it for their support. See also INDIA RUBBER.

Rubber-trees, the sources of caoutchouc (q.v.) or india-rubber (q.v.) are botanically various and widely distributed in the warmer parts of the world. They belong to the four allied groups *Moraceæ*, *Euphorbiaceæ*, *Artocarpaceæ*, and *Apocynaceæ*, but not all the members of these families yield caoutchouc, while a similar juice may be obtained from certain outside plants, but not in commercial quantities. This substance (latex) is one of those, like the "milk" of the milkweeds, and many others, which are elaborated in the green surface cells and conducted through the plant, for its nourishment, by the lactiferous canals. In the rubber plants they run just beneath the bark, and often carry the sticky juice in excess, so that "in the gigantic trunks of tropical fig-trees," as Kerner says, "the latex often wells up in large quantities from rifts in the bark which have arisen spontaneously, and thickens into long strings and ropes of india-rubber hanging down like a mantle." A rough test of whether a tree-juice has the true properties of caoutchouc is to rub some of it between the fingers until it exhibits the recognized elastic threads; inferior juices of other trees are sometimes mingled with it by native gatherers, as adulterants, and these may in some cases nearly ruin the whole package, by developing other qualities in coagulation, as, for instance, those of gutta-percha (q.v.).

The caoutchouc-yielding trees occur in all tropical regions, but are different botanically in each region. The principal commercial supply and the best is obtained from the valley of the Amazon, and is known to the trade as Pará rubber; but all other parts of northern South America ship it in large quantities. That which comes from the valleys of the Amazon and Orinoco (Brazil, Guiana, and Venezuela) is chiefly the product of the euphorbiaceous genus *Hevea*, and especially of *H. brasiliensis*, a tree often 60 feet in height, branching from the base, which, with two or three similar species, grows abundantly in the hot, steaming lowlands along the river courses; the juice is obtained by tapping the trees, by means of incisions in the bark in the evening, and collecting the deposition next morning. Each tree will yield about six ounces in three days, and then must be allowed to rest. The main resources in Guiana are the species *H. guayensis* and *paucifolia*, the former of which is called by the natives "cahoutchou." That exported from Maranhão is similar. The Ceará rubber is derived from a smaller euphorbiaceous tree (*Manihot glaziovii*), which grows over a large area in that part of Brazil, and is tapped when about two years old. The Pernambuco or Mangabeira rubber is the product of a small, drooping tree (*Hancornia speciosa*) of the family *Apocynaceæ*, which grows on the hills and yields the edible fruit "mangaba," for the sake of which it is frequently cultivated in orchards. This is a comparatively poor sort of rubber. Nearly all of the crude rubber above mentioned is exported to Europe, the United States deriving its supply mainly from Colombia, Ecuador, Central America, and Mexico. This is mainly the product of a tree (*Castilloa elastica*) of the family *Artocarpaceæ*, related to the breadfruit.

It is a lofty tree, with a trunk three feet or more in diameter, and large, hairy, oblong leaves, which grows in the rich soil of wet, low-lying, heavily forested valleys. With some allied species it flourishes from Mexico and Cuba to the mountains of Venezuela and the Andes, which separate it from the heaves of Brazil. It reaches its best size and condition in Panama and Nicaragua, where an average tree is expected to yield 20 gallons of milk, or about 40 pounds of crude rubber. Honduras rubber is good, but that from Guatemala is inferior.

The Asiatic supply comes from various ports in Assam (via Calcutta), and eastward to Borneo, and is chiefly produced by the rubber-fig (*Ficus elastica*). The trees may be tapped when 25 years old, and for 50 years afterward will yield 40 pounds of caoutchouc every three years. A large variety of other plants and trees in the Malayan and Papuan region yield rubber, some of which is excellent and of growing importance commercially, and everywhere the early rough and wasteful methods of obtaining the product are being corrected. It is also obtained in northern Australia, in Fiji, and in various neighboring islands. More than 100 different trees are known to give rubber-making juices in commercial quantities, while in a great many others, as lettuce, poppy, milkweed, and others, it is present in small quantities. The juice of the Brazilian *Hevea* trees is said to yield about 30 per cent of pure rubber; but a product of less than 15 per cent is not regarded as commercially profitable.

Africa is now the principal source of the rubber supply of the world next to South America. The bulk of that from the west coast and equatorial region is obtained from various climbing shrubs belonging to or allied to the apocynaceous genus *Vahea*, few of which are well known to botanists. In Liberia and somewhat elsewhere are rubber-bearing figs; and a large part of the extensive product of Madagascar and the Mozambique coast is derived from a *Walbergia*, species of which also give much of the caoutchouc received from the Malayan Islands.

Cultivation of Rubber Trees.—Attempts have been made in most countries, where suitable conditions prevail, to propagate the rubber trees in plantations of prescribed dimensions, and capable of rational supervision by experts, rendering the planter independent of native delinquencies and assuring annual crops of first quality for an indefinite number of years. It has been demonstrated that the rubber tree can produce, under proper management, a regular and increasing crop, for each year of its natural life, without being injured. The experiment of re-stocking the former rubber forests of the southern states of Mexico is now being carried on by American capitalists with prospects of success. Many thousands of acres of rubber lands have been purchased from the Mexican government, and are rapidly being developed in plantations. Progress has been retarded on account of lack of previous knowledge or precedent in the business, yet the difficulties seem to have been surmounted, and it is now demonstrated that the rubber tree can be artificially cultivated when conditions under which its growth is stimulated are understood. In Chiapas, the numerous river-bottoms afford the character of soil acquired,

favorable atmospheric conditions, and abundance of rain-fall. Covered with thick tropical forest growth, which it is necessary to clear, the rubber tree shoots, raised from seed in neighboring nurseries and about a foot high, are planted in the clearings to the number of 200 trees to the acre. But little further care is required. At six years of age the tree is tapped, yielding a small first crop. Hundreds of thousands of every age, from one to four years, are growing in apparent strength and luxuriance, with a prospect of affording an ever increasing supply of the crude product annually. The Central American rubber-tree will not flourish in swamps, though moisture is a prime requisite. The altitude it affects varies in different lands, preferably but little above sea-level, but in some localities 1,000, 1,500, or even 3,000 feet above tide water. The rubber-plant so commonly grown as an ornamental house-plant is the East Indian fig (*Ficus elastica*).

Rubble Work. See MASONRY.

Rubefacients, substances or agents which, when applied for some time to the skin, occasion a redness and increase of heat. When the irritant effect of any agent amounts to blistering, or causes discharge of pus or matter, the action is said to be vesicant or suppurative. All these agencies are included under the one term counter-irritants, the rubefacient action being the mildest of the three, and dependent generally upon the form and duration of the application; as, for instance, mustard or ammonia may be used so as to produce only the most transient redness, or may be made to cause blistering or suppuration. Among the most commonly used rubefacients are hot water, ammonia, mustard, oil of turpentine, powdered ginger, spirit of wine, camphor, and chloroform vapor.

Rubellite, the red or deep pink variety of tourmaline (q.v.); when transparent, valued as a gem.

Rubens, roo'bēnz, **Peter Paul**, Flemish painter: b. Siegen, western Germany, 29 June 1577; d. Antwerp 30 May 1640. He was the son of a person of good citizen family who had gone from Antwerp to Cologne on account of religious oppression, and who, while there, had become the steward of Anne, wife of William of Orange-Nassau, the famous liberator of the United Provinces. He was compelled to remove to Siegen, a small town, because of offenses committed, and it was not until his death in 1588 that the widow was able to return to Antwerp. There the boy studied in the Jesuit College and was page to a lady of rank. He studied art first with Tobias van der Haegt, and afterward with Adam van Noort, but his chief master was Otto van Veen (called Otto Vaenius). With this artist, who was court painter to the Regent of the Netherlands under Spain, the Infanta Isabella Clara Eugenia, Rubens remained from 1596 to 1600; and at the end of that period of time went to Italy. It is evident that he had the best introductions; and yet the young man's courteous manners and liberal training, as well as his great ability as a painter of portraits, must have made him welcome at once.

At Venice he met the famous and magnificent Duke of Mantua, Vincenzo Gonzaga, who at once employed him, sending him first to Rome, placing him near his own person at his own pal-

ace in Mantua, and sending him to Spain in 1603. While in Mantua he painted the famous triple altar-piece for the Prince's chapel; a work of which the greater part of the middle composition is in the Church of Saint Trinità in Mantua, one wing at Nancy in the Provincial Museum, and one at Antwerp. It was not until 1608 that he returned to the North, finding his mother dead on his arrival; and settled in Antwerp, his home from that time. It was then that he painted the first of the two wonderful pictures which are in the Cathedral of Antwerp, the 'Raising of the Cross'; and two years later, for the Company of the Arquebusers, its companion, the famous 'Descent from the Cross,' which is in itself a perfect embodiment of Rubens' art. He married, and now having property, both from his own inheritance and labor, and in right of his wife, bought land and built himself a house, of which drawings remain and in which he lived for 30 years in the fashion of a very wealthy burgher; though having, through the practice of his art, unusually close relations with the Infanta's court and the nobility, both Spanish and Flemish. It was in this capacity that he went to Spain on a mission for his patroness, the regent of the Netherlands, and her husband, the Archduke Albert of Austria, and was sent from Spain to England by the famous minister, Olivares. It is not to be forgotten that he was looked upon as a subject of the Spanish monarchy, and that in his capacity as a good Catholic he would have felt no objection to this view of the case, though he never took sides strongly against the Protestant rising of many of his countrymen. In England he was knighted by King Charles I. Finally in 1630, being then in his 54th year, he returned to Antwerp and married a second time. From this time onward his art employed him almost incessantly, in spite of a short intervention due to religious divisions between the northern and southern provinces; and his fame and popularity increased until his death in 1640 in Antwerp.

Few artists have had so varied a career, with so many other subjects of high interest to interfere with the peaceful pursuit of their art; and yet few artists have approached Rubens in the amount of artistic work done. This is to be accounted for in part by his extraordinary skill and success in assimilating the work of his many assistants (their names are those of men afterward famous in their art, chief among them Jordaens and Van Dyck); but partly also by the almost unexampled facility of work which he gained and which remains unique in the records of the art of painting. In his earlier days he copied great numbers of paintings by Italian masters, as was the custom then, and there can be no doubt that his facility and range were greatly increased by this practice. His work done after the age of 30 is uniformly wonderful for his power over all his materials, and all the different processes which enter into painting on a large scale. The fresh and rosy scheme of color which he adopted must have been natural to his instincts; original with him and not derived; moreover, his strong and intelligent drawing, though gained by practice in many schools, was still his own creation. His tendency to excess of action and to the appearance of violence, as

in the famous 'Fall of the Rebel Angels,' in Munich, and many similar works, does not seem to imply a headlong or self-forgetful mood; he seems to have been always master of himself, and his paintings were always popular (that is, in sympathy with his times), in style and management. He became in this way the typical artist of his epoch and the most admired master, the man chosen for great state undertakings in art as well as in diplomacy. It was in this capacity that he was employed by the Queen Dowager of France, widow of Henry IV., to decorate her palace of the Luxembourg in Paris, and the great paintings which are now in the new Hall of Rubens in the Louvre were prepared for that purpose. Studies for them are at Munich.

All the treatises on Flemish painting deal with Rubens, and the dictionaries of artists give him much space. The most important book devoted to him is that by Emile Michel, translated into English as 'Rubens, his Life, his Work, and his Time' (London 1899). This book is very richly illustrated. The collections of artists' biographies do not always contain Rubens' biography; but an excellent life of him by Charles W. Kett is included in the series called 'Illustrated Biographies of Great Artists' (1878-9). There are many books published in Belgium, either in French or in Flemish, which deal with the different stages in his remarkable career, and some of these are readily accessible. The essay on Rubens in 'Great Masters' by John La Farge (New York, 1904) is of great critical value. The 'Gazette des Beaux-Arts' has several important papers with elaborate illustrations.

RUSSELL STURGIS.

Rubicon, roo'bī-kōn, a river in Italy, of some celebrity in Roman history, Cæsar having by crossing this stream, at that time regarded as the northern boundary of Italy, finally committed himself to the civil war. Hence the phrase, "to pass the Rubicon," is to take the decisive step by which one commits himself to a hazardous enterprise. It is very doubtful under what modern name the Rubicon now exists, the honor being claimed by two streams—the Fiumicino and the Luso.

Rubidium, a rare metal discovered by Bunsen and Kirchhoff in 1860, by means of spectral analysis, in the residue obtained by evaporating a large quantity of the mineral water of Dürkheim, Germany. The metal and its salts exhibit two dark red lines in the blue part of the spectrum—hence the name, from the Latin *rubidus*, "dark red." Rubidium has the atomic weight 85.4, and the symbol Rb. It is a white, shining metal, having a specific gravity of 1.52; at ordinary temperatures—even so low, indeed, as -10° C.—it is soft as wax; it is easily oxidized; when thrown on water it decomposes that liquid with evolution of hydrogen, which takes fire because of the heat produced in the reaction. Rubidium forms one of the metals of the alkalis, being analogous in its properties with potassium and sodium; its compounds also closely resemble those of these metals; thus it forms a characteristic hydrate (RbHO), which is a white, solid substance, feeling unctuous to the touch, deliquescent in the air, and dissolving in water to form a strongly alkaline liquid. Rubidium forms one chloride (RbCl), bromide

(RbBr), and iodide (RbI), and in all its compounds comport itself in a manner precisely analogous with potassium and sodium.

Rubinstein, roo'bīn-stīn, **Anton Gregor**, Russian composer and pianist: b. Wechwotynetz 30 Nov. 1830; d. 20 Nov. 1894. His parents were Jewish and soon after his birth removed to Moscow. His mother, being a good musician, was his first teacher; he next studied with Villoing, a Frenchman, and at nine played in a concert at Moscow. He accompanied his teacher to Paris, where in 1840 he played before the most distinguished musicians. He was advised by Liszt to study in Germany and after a concert tour in England, Holland and elsewhere, he settled in Berlin to study theory under Dehn. He returned to Russia in 1848 settling in Saint Petersburg. In 1855 he was enabled to visit Germany again for study; here also he succeeded in finding publishers for his compositions, and made concert tours that extended to London and Paris. In 1858 he was again in Saint Petersburg, where he was appointed court pianist; in 1859 he became director of the Russian Music Society and in 1862 founded the Saint Petersburg Conservatory, and was director until 1867. He made concert tours in Europe in the following years and appeared in America in 1872-3. As a piano player he occupied the front rank; in perfection of technique he had few peers and was excelled by none. As a composer he was prolific, brilliant; but showed a lack of self-discipline which prevented his compositions from attaining the highest merit. He wrote operas, pianoforte pieces, orchestral scores and songs; his best known works being the Ocean Symphony and the pianoforte concertos in G major and D minor and the trio in B-flat. His operas, such as 'The Maccabees' (1875); 'Paradise Lost' (1875); 'Sulamith' (1883), have had but a partial success.

Ruble, roo'bl, or **Rouble**, a silver coin, the standard of money in Russia, containing 278 grains of fine silver, and equal to about 76 cents in American money. In actual circulation there is little but paper money, valued at from ten to twenty per cent below its nominal value. A ruble is divided into 100 copecks. Half and quarter rubles, and fifth, tenth, and twentieth parts of a ruble, are coined in silver; gold coins of the nominal value of three rubles (the imperial ducat) and five rubles (the demi-imperial) are also coined.

Rubric (Lat. *rubus*, red), was the name applied to those portions of old manuscripts and books which, for typographical embellishment or on account of their importance in the text, were printed in red ink. Often, as in the old monastic manuscripts, only initial letters in the paragraph were so treated. With the development of the copyist's art, however, rubricated manuscripts became ornate; the initial letter of every noun, perhaps, was rubricated, chapter headings, thumb-nail indexes, marginal comments, and in cases whole passages of the text were highly ornamented rubrics.

The use of the red letter text became common in the case of religious treatises, and so from the fact that certain rules and directions in prayer books, explanations and responses,



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are printed in red ink. This is the case with the Roman missal, where the matins, lauds, beatifications, etc., are always in red; in the liturgy, where the directions for the performance of the service are in red. In the old Bibles the chapter heads were so treated. Modern typography discards such profuse use of colored ink and usually substitutes in its place type of a different face from the rest of the text, but the portions thus emphasized are still called rubrics.

Spanish custom has given another significance to the word, wherein it is meant to denote the flourish so common after Spanish signatures. This likewise results from the fact that the rubrics were the most conspicuous features of a page.

Ru'bus, a genus of plants of the order *Rosacea*, of which more than 1,500 species have been described, but probably only 200 are well marked, the remainder being intermediate forms. They are mostly natives of the northern hemisphere and are especially abundant in Europe. About 40 are indigenous to North America. They are mostly shrubs whose stems (canes) are biennial or annual, prickly, erect, curving, climbing or trailing. They have simple or compound alternate leaves, white or pink flowers usually in corymbs or racemes, followed generally by compound fruits consisting of many drupelets. In the blackberry the drupelets are united to the receptacle; in the raspberry they are not. Besides the raspberry, blackberry, and dewberry (qq.v.), many species are useful for food or ornament. Among the best known are the European bramble (*R. fruticosus*), wineberry (*R. phanicolasius*), flowering raspberry (*R. odoratus*), and the cloudberry, yellowberry, bake-apple berry (*R. chamæmorus*). The Rocky Mountain flowering raspberry (*R. deliciosus*), the brier rose, bridal rose or strawberry-raspberry (*R. rosafolius*), and *R. crataegifolius* are well known ornamental species in shrubberies, etc. See BLACKBERRY, RASPBERRY, etc.

Ruby, the rich red, transparent variety of corundum. The name is sometimes used for other red gems (see RUBY SPINEL), and improperly for richly colored garnets, of the variety pyrope. The stones called Cape rubies and Arizona rubies are only fine pyropes, coming respectively from the South African diamond mines and from Arizona and New Mexico. (See PYROPE.) Siberian ruby is a term sometimes applied to gems of rubellite or red tourmaline (q.v.), and Brazilian ruby to the deeper shades of pink topaz, altered to that color by heat. The true rubies recently mined in the Cowee Valley, in North Carolina, have attracted much interest, being in some cases as fine as those from Burma; but they are mostly small, and it is not certain whether they will prove of real importance. They occur in a greatly decomposed igneous rock, in the same manner as the very similar crystals of sapphire from Yogo Gulch, Montana. The rubies of Burma, formerly spoken of as Pegu, are derived from a crystalline limestone. In these cases, and indeed generally, the gems are largely found in gravels and surface deposits formed from the decomposition of the

parent rocks. Like all the deeply-colored corundum gems, rubies are strongly dichroic, their color varying with the direction in which light traverses the crystal, whether transverse or parallel to the axis of the prism. The presence of microscopic cavities or of included crystals of extreme minuteness, disposed in a certain parallelism to the crystalline axes, produces the optical effect known as asterism, which is exhibited by the highly prized gems called star rubies (and star sapphires). In less amount or when irregularly distributed, the same causes produce defects known as "silk," and cloudiness. Many efforts have been made to produce the ruby by chemical means, and a dozen or more processes have been devised with greater or less success within the past 50 years, but with little practical result. Crystals have been obtained, of fine color, but mostly small, or in flat hexagonal plates too thin to furnish gems. Some years ago, larger pieces appeared in the market, that caused some concern from their close resemblance to natural rubies. The process was not made known, but was judged to be that discovered by Frémy and Feil, by fusing an aluminate of lead with silica. They were detectable by the microscope, which showed that they contained minute cavities that were rounded and bubble-like, while those in real rubies are angular and crystalline. The French "Syndicate of Diamonds and Precious Stones" decided that all such rubies must be sold as "artificial," under penalty of fraud.

Ruby Matrix is a name recently given to a beautiful combination of red or pink corundum with a bright green variety of hornblende (amphibolite) found at the Cullakenee corundum mine in Clay County, North Carolina; it has been proposed to use it as an ornamental stone, though the ruby-corundum is not transparent enough to cut gems.

Ruby Spinel, this mineral is an aluminate of magnesia. It crystallizes in octahedrons, with a hardness of 8, and a specific gravity of 3.5 to 3.7, usually of some shade of red, sometimes very rich, and transparent to translucent. Fine specimens make beautiful gems, known as spinel rubies, not readily distinguishable from true (corundum) rubies, though less hard, less dense, and less valuable. The historic "Black Prince" ruby, in the crown jewels of England, is believed to be a spinel. True rubies may also be distinguished from spinels by the dichroism which belongs to all the deeply colored corundum gems. Red spinel has several other varieties, with special names; it is called Balas ruby when the color is rich pink, rubicelle when it inclines toward an orange red, and almandine ruby when it tends toward a purplish. Spinel is a frequent associate of the true ruby, in Burma, Siam, Ceylon, etc. It usually occurs in crystalline limestones, though occasionally found in other metamorphic, and even in volcanic, rocks.

Ruby-throat. See HUMMING-BIRD.

Rückert, Friedrich fréd'rih rük'ért, German poet and Orientalist: b. Schweinfurt, Bavaria, 16 May 1788; d. Neuses, near Coburg, 31 Jan. 1866. His education was received at Heidelberg and at Würzburg. He first began

to write under the pseudonym of 'Freimund Raimar,' and 'Deutsche Gedichte' appeared with that signature. From 1826 to 1841 he occupied the chair of Oriental languages in the University of Erlangen, and while there was called to Berlin as privy councillor to Frederick IV. Here he also pursued his work as a philologist and poet. He retired to private life in 1848, becoming one of the most prolific writers of his day. He had a remarkable command of language and wrote almost every known form of verse. His original poems relating to the East are: 'Morgenländische Sagen und Geschichten' (1837); 'Rostem und Suhrah: eine Heldengeschichte' (1838); and 'Die Weisheit des Brahmanen' (1836-9). His adaptations include 'Die Verwandlungen des Abn Seid' of Hariri (1826); 'Nal und Damajanti' from the 'Mahabahrata' (1828); 'Amrilkais' (1843); and 'Hamasa' (1846). Among his other works are 'Saul und David' (1843); 'Liebesfrühling' (1844); and 'Lieder und Sprüche' (1866). Consult biographies by Beyer (1868-77); Konrad Fischer (1889); and F. Reuter, 'Rückert in Erlangen und Joseph Kopp' (1891).

Ruckstuhl, rük'stool, **Frederic Wellington**, American sculptor: b. Breitenbach, Alsace, 22 May 1853. At two he was brought to America by his parents who settled in Saint Louis, Mo. His art studies were begun in 1883 in Paris. His first exhibit, a life size nude figure called 'Evening,' won honorable mention in the Salon of 1888. His principal works are: a bronze figure 'Victory,' on the soldiers and sailors' monument at Jamaica, Long Island; the bronze 'Solon,' in the Library of Congress, Washington, D. C.; and the heads of Goethe, Franklin and Macaulay which form a part of the façade; and the heroic marbles 'Wisdom' and 'Force' above the New York Appellate Court building in Madison Square, New York.

Rudder, an oar or other instrument by which a ship is steered, being that part of the helm which consists of a piece of timber which enters the water, and is attached to the stern-post by hinges, on which it turns. The action of the rudder may be thus explained: While it remains in line with the keel, the force of the water gliding past the deadwood, or narrow portion of the stern, is equal on both sides of the rudder, and equilibrium is maintained; but if the rudder be forced to one side the pressure is taken off on the opposite side, while from acting at a less angle the water exercises an increased pressure on the side to which the rudder is turned. The effect is to force the stern round on the centre of gravity as a pivot, the ship's head, of course, turning to the same side as that on which the rudder is. When the head has sufficiently deviated from its former line the rudder is permitted to resume its straight position. In sailing on a wind, the rudder is kept permanently on one side to counteract the tendency to make leeway.

Rudder Fish, so named from being perceived usually in the wake of ships, following the movement of the rudder, and doubtless attracted by the refuse thrown overboard, is a small fish of the genus *Palinurus* allied to the mackerel family, very common in the Pacific and Atlantic oceans. *The Palinurus perci-*

formis, the rudder perch, or black pilot fish of the fishermen of Martha's Vineyard, attains a length of from nine to twelve inches, and is caught on the coasts of Massachusetts and New York, specimens having been obtained in Boston Harbor hovering around the sterns of vessels or keeping near such floating bodies as casks, planks, logs, and other flotsam. The back and top of the head is brownish with black blotches, the sides bluish-white with minute black dots, and the under parts lighter; the color of the young is a bright bronzed black, variegated with yellow circular spots obscure reddish hues and streaks of white and yellow lining the sides; there is a depression between the eyes which are protected by an overhanging bony ridge, and in front of the fleshy rays of the dorsal are eight short spines. The rudder fish belongs to the division of the scomberoids in which the first dorsal is composed of isolated spines connected by a low membrane, but unlike the scomberoids there are one or more spines in front of the anal fin.

Rudder Grange, a humorous story by Frank R. Stockton, which appeared serially in 1879 and was the first of the author's books to attract general attention. A slight thread of story suffices to connect a series of humorous episodes which result from the efforts of a young couple to establish themselves in a summer home at once desirable and inexpensive. In 'The Rudder Grangers Abroad' and 'Pomona's Travels' (1894), the principal figures in 'Rudder Grange' reappear.

Ruddiman, rüd'man, **Thomas**, Scottish scholar: b. Raggel, Banffshire, October, 1674; d. Edinburgh 19 Jan. 1757. He was graduated at Aberdeen in 1694, revised and edited several works by Scottish authors, and to the famous poetical translation of Virgil's 'Æneid,' by Bishop Douglas, added a glossary, which brought him fame as a Latin scholar. In 1714 he published his 'Rudiments of the Latin Tongue,' a work which supplanted all previous Latin grammars in use in Scotland, and which he lived to see pass through 15 editions. In 1715 became a publisher and in this capacity edited and brought out many famous books, and in 1725 the first volume of his own 'Grammaticæ Latinæ Institutiones,' and an abridgement of the three volumes in 1740. Consult: Chambers, 'Life of Ruddiman' (1794); Chambers, 'Eminent Scotsmen.'

Ruddy Duck, a rather small, quick-diving handsome duck (*Erismatura rubida*), which is to be found throughout North and Central America, breeding in all suitable localities. It is related to several foreign sea-ducks, the Australian musk-duck, etc., but is itself confined to this continent. This duck is about 17 inches long, and chiefly tawny brown, the drake becoming glossy chestnut in full breeding plumage; considerably waved and dotted, and the lower parts mottled silver-white.

Rude, François, frân-swâ rüd, French sculptor: b. Dijon 4 Jan. 1784; d. Paris 3 Nov. 1855. He was originally a blacksmith, but entered the Ecole des Beaux Arts in 1807 and was under the instruction of Cartellier. From 1815 to 1827 he worked at Brussels decorating the royal palace and subsequently settled at Paris, where his real artistic life began. His

chief works, which indicate a combination of antique simplicity with modern naturalism, are his 'Mercury' (1827), now in the Louvre; his 'Neapolitan Fisher Boy,' also in the Louvre; his 'Louis XIII.,' as a boy 1842; 'Sepulchral Monument of Cavaignac,' in the cemetery of Montmartre (1847); a 'Crucifixion' and the 'Maid of Orleans' (1852), both in the Louvre; 'Hebe' and 'Love as the Conqueror of the World,' in the museum at Dijon.

Rüdiger, Fedor Vasilievitch, Russian count and general: b. Courland, 1780; d. Carlsbad, Bohemia, 22 June 1856. He came of a noble Courland family, and entered the army when a youth. He saw active service in Germany and France during the campaigns of 1813-14 as a major-general; in 1828-29 served as a lieutenant-general in the war with Turkey; and after the suppression of the Polish rebellion, was promoted to be general of cavalry. Under Paskevitch he followed the campaign in Hungary in 1849, took an active part in the battles of Waitzen and Debreczin, and on Görgey's attempted retreat to Arad, pursued him and compelled his surrender at Világos. During Paskevitch's absence in the Crimea in 1854, Rüdiger was appointed lieutenant-governor of Poland.

Rudinger, Nicolaus, German physician and professor of anatomy; b. Radesheim, Prussia, 25 March 1832; d. Munich 23 Aug. 1896. After studies at the universities of Heidelberg and Giessen, he was graduated M.D. in 1855 at the latter university. He had exhibited a natural aptitude for anatomy and became assistant to his instructor Bischoff in the University of Munich, where in 1881 he was appointed Professor of Anatomy. In his lectures and his contributions to professional periodicals, photographic reproductions of his operations were notable features; from 1867 to 1870 he was co-editor of 'Monatsschrift für Ohrenheilkunde' and in 1877 of 'Beiträge zur Anthropologie und Urgeschichte Bayerns'; the most valuable of his numerous publications are 'Atlas des peripherischen Nerven-systems des menschlichen Körpers' (1872); 'Atlas des menschlichen Hörgörorganes' (1875); and 'Topographisch-chirurgische Anatomie des Menschen' (1873-79).

Rudini, roo-dé'né, Antonio Starrabba di, MARQUIS, Italian statesman: b. Palermo, Sicily, 6 April 1839; d. 7 Aug. 1908. In 1866 he became mayor of Palermo, and in 1867 a member of the Chamber of Deputies. He was appointed minister of the interior in the following year. After the fall of the Menabrea cabinet he held no prominent office until in 1891, when, having become the head of the constitutional party, he succeeded Signor Crispi in the ministry of foreign affairs, and was made premier. In 1892 the premiership passed again to Crispi, but in 1896 Rudini returned to power as a result of Signor Crispi's disastrous Abyssinian policy. He continued in the premiership until 1898, when he resigned his office. His renewal of the Triple Alliance and conclusion of peace with Abyssinia were the most important of his executive acts, while his continued yielding to the pressure of the radical party, and failure to weld the conservative elements of the Italian parliament are quoted against his administration.

Rudler, Frederick William, English scientist, educator, and writer: b. London 8 July 1841. A predilection for scientific study and research led to an early appointment as assistant in the Museum of Practical Geology in 1861. In 1870 he was elected assistant secretary to the Ethnological Society, and from 1876 to 1879 was professor of natural science in the University College of Wales, an appointment he resigned on being made curator of the museum. He was one of the lecturers of the London Society for the Extension of University Teaching; in 1880 was president of the anthropological department of the British Association; and in 1880 president of the Geologists' Association. He was appointed director of the Anthropological Institute, and editor of its 'Journal,' was co-editor of Ure's 'Dictionary of Arts,' and as a prolific contributor of scientific subjects to encyclopedias and technical periodicals is well-known.

Rudolf I., roo'dölf, emperor of Germany, founder of the imperial house of Austria: b. 1 May 1218; d. Gernersheim 15 July 1291. He was the eldest son of Albert IV., count of Hapsburg and landgrave of Alsace, was brought up in the court and camp of the Emperor Frederick II.; and on the death of his father succeeded to lands of a very moderate extent, which, in the spirit of the times, he sought to augment by military enterprises. He gained some territory by his marriage in 1245 and more by his frequent military aggressions. In 1273, while encamped before the walls of Basel, he received the unexpected intelligence that he was elected king of the Romans, and emperor, in preference to Alphonso, king of Castile, and Ottokar, king of Bohemia. His confirmation was not attained without some difficulty, however. Pope Gregory X. induced the King of Castile to withdraw his pretensions, but the King of Bohemia, at that time one of the powerful princes in Europe, persisted in his opposition, and a war ensued, in which he was defeated and compelled to sue for peace, and agree to pay homage. He broke the treaty in 1277, but the following year was defeated a second time, and slain. The Diet of Augsburg in 1282 formally conferred Austria, Styria, Carinthia, and Carinola on Rudolf's two sons, Albrecht and Rudolf, as a joint inheritance. He restored peace and order to Germany, and wisely put down the private fortresses, which served as a retreat to banditti and to ferocious nobles. For these and other eminent services in the same spirit he obtained the title of 'a living law,' and was regarded as a second founder of the German Empire. He asked the Diet at Frankfort to secure the imperial throne to his son Albrecht, but the electors were jealous of the powerful family and their refusal caused such mortification to the aged emperor that he did not long survive. Consult: Kopp, 'König Rudolf und seine Zeit' (1845-9, continued by Busson 1871); Hein, 'Rudolf von Habsburg' (1874); Schulte, 'Geschichte der Habsburger' (1887); Zisterer, 'Gregory X. und Rudolf von Habsburg' (1891).

Rudolf II., emperor of Austria: b. Vienna 18 July 1552; d. Prague 20 Jan. 1612. He was educated in Spain, and before the death of his father, Maximilian II., was crowned king of Hungary in 1572; king of Bohemia in 1575, the same year being also crowned at Ratisbon

king of the Romans. He succeeded to the Austrian throne 12 Oct. 1576. His disposition was mild and his tastes inclined toward literature rather than toward government. Early in his reign he began to impose restrictions upon the holding of public offices by Protestants and in some districts civil war resulted. The western parts of the empire were enabled to overcome the designs of the king, and by 1603 the Protestants formed an offensive and defensive alliance at Heidelberg to maintain their civil and religious liberties. In Austria, Bohemia and Hungary, however, the Protestant religion was for a time practically suppressed. The Turks made constant inroads in the east and in 1596 Mahomet invaded Hungary, captured Erlau and defeated the Austrians under Archduke Maximilian, though he ceased his incursions at this point. In 1608 Rudolf's brother Matthias, who had made a treaty with the Turks and pacified the disaffected Hungarians, compelled Rudolf to acknowledge him king of Hungary and governor of Austria and Moravia. With this confirmation of Matthias' power the states of Austria regained the religious privileges they had enjoyed under Maximilian. In 1611 Rudolf was formally deposed and Matthias succeeded him. He was the patron of Kepler and Tycho Brahe and the astronomical calculations produced by these two are known as the 'Rudolphine Tables.' Consult: Gendely, 'Rudolf II. und seine Zeit' (1863-5).

Rue, a perennial (*Ruta graveolens*), wild in the Mediterranean regions, but also cultivated. Its stems are about two feet high, bearing alternate decompound bluish green leaves, pellucid-dotted, with an acrid juice and bitter taste; and corymbs of yellowish green small four-merous flowers, with crimped petals. Rue has been employed medicinally on account of its antispasmodic and stimulant properties, and was also used in folk medicine as a disinfectant, probably because of its strong and disagreeable odor and taste, which, however, did not prevent its use as salad. Rue also entered largely into magic rites, and witch-lore. Early missionaries in England were said to have sprinkled water from brushes made of rue, whence the name referred to by Ophelia. "There's rue for you . . . We may call it, herb of grace o' Sundays," and Perdita speaks of it, with rosemary, as one of the flowers for remembrance.

Ruff, a sandpiper (*Macetes pugnax*) of the northern parts of the Old World, the female of which is called "reeve." It is about 10 inches long, and the bill $1\frac{1}{4}$; above it is varied with black, rufous, and gray, arranged in oblique bands on the scapulars and tertiaries, and whitish below; primaries dark brown, with green reflections above and with inner webs finely mottled toward the base; the tail transversely barred; sides of rump white, bill brown, and legs yellow. The males in spring have the feathers of the neck developed into a kind of ruff, whence the common name, and the face is covered with reddish papillæ; they fight during the breeding season, unlike most wading birds; they are also polygamous, and larger than the females, in these respects seeming to form one of the links between wading and gallinaceous birds. The colors of the ruff vary exceedingly, and no two are precisely similar. They

are natives of northern Europe and Asia, migrating southward during winter, and they are found chiefly in flocks, in marshy districts; they feed at night, on worms, insects, and larvæ; the nest is made of coarse grass, and is placed in a hollow of the ground; the eggs are 4 or 5, pointed, green, with brown specks. Their flesh is highly esteemed for the table; they are taken alive in nets, and are fattened for market on bread and milk and boiled wheat, in a dark place to prevent their fighting; great numbers are sent from Holland to London.

Ruffed Grouse. See GROUSE.

Ruffed Lemur. See LEMUR.

Ruffin, Edmund, American agriculturist: b. Prince George County, Va., 5 Jan. 1794; d. near Danville, Va., 15 June 1865. He was educated at William and Mary College, served in the Virginia legislature, was for many years president of the Virginia Agricultural Society, and in 1833-42 editor of the 'Farmer's Register.' He was an ardent state-rights man, and as member of the Palmetto Guard of South Carolina fired the first shot on Fort Sumter in 1861. He committed suicide because of his unwillingness to live under the United States government. He published: 'Essay on Agricultural Education' (1833); 'Anticipations of the Future to Serve as Lessons for the Present Time' (1860); edited William Byrd's 'Westover Manuscripts' (1841); etc.

Rugby, England, a market town of Warwickshire, 81 miles by rail northwest of London. It is picturesquely situated on an eminence south of the Avon, and is celebrated for its public school. (see RUGBY SCHOOL). The parish church recently restored, the modern municipal offices, and the free public library are other noteworthy features.

Rugby, Tenn., the place in Morgan County, about 140 miles north of Chattanooga, where Thomas Hughes (q.v.) and others from England established a colony in 1880. They purchased a large tract of land, laid out a town, divided the remaining portion into farms and parks, and established several industries. It is in a rich mining and agricultural region on the Cumberland plateau. The settlement proved a failure; but the place is now a health resort.

Rugby School, a famous English public school founded in 1567 by Lawrence Sheriff, who bequeathed for its support property in Manchester Square, London. Until the second quarter of the 19th century its importance was local in character, however, but under the headmastership of Arnold (q.v.) 1828-42, it became one of the greatest schools of England,—to be ranked with Westminster, Eton, and Harrow. Among famous headmasters who followed Arnold are Archbishop Tait, the late Dean Bradley of Westminster, the late Archbishop Temple, and John Percival, now bishop of Hereford, who was succeeded in 1895 by Rev. Herbert Armitage James, the present headmaster. The roll of distinguished Rugby scholars is a long one; among them may be mentioned Matthew Arnold, Dean Stanley, Landor, Clough, Thomas Hughes, author of 'Tom Brown's School Days,' Dean Vaughan and Lord Derby. Under the mastership of Dr. Temple (1857-69) the chapel was rebuilt, a gymnasium erected, and other

new buildings added, while under Dr. Jex-Blake (1874-87) still more building was carried on and Rugby is to-day particularly modern in the character of its buildings, which are Elizabethan in style, and in its appointments generally. Consult: Goulburn, 'The Book of Rugby School' (1856); Hughes, 'Tom Brown's School Days' (1857); 'Life of Thomas Arnold' (1860); Bloxam and Payne-Smith, 'Rugby: its School and Neighborhood' (1889); Rouse, 'History of Rugby School' (1898).

Ruge, roo'gě, Arnold, German socialist: b. Bergen, Prussia, 13 Sept. 1802; d. Brighton, England, 31 Dec. 1880. He was educated at Heidelberg, Jena, and the University of Halle, where in 1830 he became a professor. His first literary production was a translation of Sophocles' 'Œdipus in Kolonos' (1830). He was later identified with the founding of the 'Hallesche Jahrbücher' and became known as an advocate of radical doctrines. In 1843 he went to Paris where he was associated with Karl Marx, and there published his 'Zwei Jahre in Paris.' In 1847 he started a journal, 'Die Reform,' in Berlin. Accused of complicity in the revolution of 1848, he fled to England. He was there identified with Mazzini and Ledru-Rollin in their efforts to organize a democratic league for the establishment of political equality throughout the world. The movement to unite the provinces of Germany in 1866-70 was strengthened by his sympathy, and his services in this cause were recognized by the German empire. He published: 'Political Pictures' (1848); 'Our System' (1850); 'In Former Times' (1862-7); and a 'Manifesto of the German People' (1866).

Rügen, rū'gēn, an island belonging to Germany; in the Baltic Sea; area, 377 square miles. The coast has many indentations; on the northeast the island terminates in a chalk cliff, nearly perpendicular and about 400 feet above the water. Peculiar shaped boulders are found on different parts of the island. According to Tacitus, the ancient Germanic goddess Hertha (Earth) was worshipped here at Hertha Lake. The soil is fertile; agriculture, stock-raising, and fishing are the chief occupations. The coast villages are popular sea-bathing resorts. Bergen is the capital. Pop. 46,800.

Rugendas, roo'gēn-dās, Georg Philipp, German painter: b. Augsburg, 1666; d. there 1742. His right hand becoming disabled he painted and engraved with his left. He exposed himself to the fire and carnage at Augsburg that he might delineate the scene.

Ruger, roo'gēr, Thomas Howard, American army officer: b. Lima, N. Y., 2 April 1833; d. Stamford, Conn., 3 June 1907. He was graduated from West Point in 1854, studied law, and in 1855-61 was engaged in practice. At the outbreak of the Civil War he was appointed lieutenant-colonel and was prominent in numerous engagements. He suppressed the draft riots in New York in 1863, was in command of a division at Gettysburg, served under General Sherman, and in 1864 was brevetted major-general of volunteers. He was mustered out of the volunteer service in 1866, and in that year was appointed colonel in the regular army. In 1868 he was military governor of Georgia, superintendent at West Point in 1871-6, and in 1876-8 was in command of the Department of

the South. He was promoted major-general in 1895, and in 1897 was retired.

Ruggles, rū'g'lz, Timothy, American lawyer, politician, and loyalist: b. Rochester, Mass., 20 Oct. 1711; d. Wilmot, Nova Scotia, 4 Aug. 1795. He was graduated from Harvard in 1732, represented Rochester in the general court in 1736, opened a law office at Sandwich, Barnstable County, and was connected with many cases of local importance in Plymouth, Bristol, and Barnstable counties. Subsequently he removed to Hardwick. In 1755 he was second in command to Sir William Johnson at the battle of Lake George, in 1756, was made judge of the court of common pleas of Worcester County, and represented Hardwick in the general court. In 1762-3 he was speaker of the house, and from 1762 until the Revolution chief justice of the court of common pleas in Worcester County. He served with distinction in 1759-60 in the expeditions against Quebec and Montreal, and in recognition received the sinecure post of surveyor-general of the King's forests. He was a delegate in 1765 to the Stamp-act congress at New York and was elected its president. Upon his refusal to forward to Great Britain the addresses and petitions passed by the congress, he was reprimanded by the general court. From that time he was identified with the royalist cause. In 1774 he was made mandamus councillor, and in consequence was forced for safety to flee from Hardwick to Boston, then garri-soned by the British. He made some efforts to recruit a loyalist corps, and in 1779, on the departure of the British troops, went with them to Nova Scotia, where he became a proprietor of the town of Digby. He was a scholar and wit, and an excellent, though aggressive, pleader.

Rugs, Oriental. *History.*—The origin of the floor coverings, popularly known as Oriental rugs, is a matter of tradition, and therefore purely suppositional, for the fragmentary record of the ancients, on this subject, is casual and exceedingly incomplete.

Undoubtedly, however, along with the slow evolution of human progress, rugs, in some form, filled their proper places in the scant household furniture of primitive man.

An old Hebraic tradition ascribes distinction of skillful spinning of wool and weaving of cloth, to Naamah, daughter of Lamech, who was a near descendant of Adam, thus placing the handicraft of weaving close to the Biblical account of the beginning of the human race.

It is not at all improbable that Egypt, the successful producer of many useful industries of the ancients, improved the crude handwork of her predecessors, for we possess records of rugs on her rock-cut tombs, carvings, and monuments, some of which date as early as twenty-seven centuries B. C.

Other wall paintings, stone carvings, and monuments in the Euphrates Valley indicate clearly that the dwellers of these regions such as Chaldeans, Assyrians, Armenians, and Persians were the first to use the rug for floor coverings, wall hangings, tomb coverings, awnings, and for devotional purposes; and that afterwards the conquerors of these peoples, the Greeks, Romans, Turks, Turkomans, and Saracens, took up the industry and spread its popularity throughout their dominions.

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Ancient Authorities.—Besides Biblical writers, among the ancients who mention rugs and carpets, are included Diodorus, Ebers, Homer, Plautus, Horace, Pliny, Josephus, Arrian, and almost all writers of note; but as stated above, not one of these famous men imparts definite information concerning the industry.

Introduced into Europe.—While very little is known concerning the rugs of the ancients, our knowledge takes definite shape and grows in volume along with the triumphant march of the religion of Mohammed, the great prophet of Arabia, whose enthusiastic followers went from victory to victory, till they threatened the very existence of mediæval Europe.

Rug making was introduced to Europe by the Moors, whose palaces and mosques in Cordova, Granada, and Castilia, were adorned with magnificent carpets; and later, when the Crusaders returned from their wars against the followers of the Crescent, they brought back with them not only a violent desire for Oriental luxuries, but a knowledge of Oriental handicraft, most important among which were rugs and carpets.

Thus, in about the latter part of the 13th century A. D., rugs were introduced in Europe and England as objects of wonderful ingenuity and of great value.

From that time interest in rugs from the Orient has constantly increased among all civilized people's till to-day they rule supreme as the most desirable and most artistic floor coverings in the world.

Process of Making.—The general process of rug-making of to-day is as old as when it was described first by ancient writers. To-day rugs are made by the descendants of first rug makers in the same crude and primitive fashion. Nothing has been changed—nothing could be changed—for the process is so absurdly rudimentary that it precludes improvement. In the use of material, dyes, and implements there has been no alteration made, since before the period when Cleopatra was presented to Cæsar wrapped in a magnificent carpet.

(a) The Loom, more properly the frame, on which a rug is to be made, consists of two perpendicular poles (not infrequently two trees) driven in the ground at a desired distance from each other; to these are fastened two horizontal bars, one on top, the other at the bottom of the poles.

(b) Tools.—It is an absurdity to dignify by the name of "tools" a crude wooden or iron comb, and a pair of common shears, which about conclude the description of the "machinery" of rug making: no other implement is required for the production of the finest Oriental rug.

(c) The Warp.—The warp of a rug consists of desired thickness of thread or twine in wool, cotton, linen, hemp, goats' or camels' hair, and in some cases silk, which is stretched, back and front, upon the horizontal bars of the frame, at even spaces, to form the foundation of the rug.

(d) The Weft.—Before actual tying of the colored yarn to the warp, the maker weaves the salvage or diaper, beginning at the bottom of the warp. To do this he introduces a shoot of hemp or wool or cotton by means of a treadle and crossing the warp, which is

repeated till a desired width is woven; then he beats this down with his comb. This cross warp, introduced after each row of the knotted yarn, is called the weft of the rug, which very often determines the fineness and the strength of the finished article.

(e) The Knotting.—All Oriental rugs are actually tied to the warp—tuft by tuft separately—these are tied by hand; so, properly speaking, rugs are not woven, but built, tied, knotted. This part of the process requires great skill, accuracy, and more than Job-like patience.

Two ways of knotting are employed throughout the Orient in rug making: (1) The Persian (Sehna) knotting; (2) the Turkish (Ghiordéz) knotting. The Persian knotting consists in winding the two ends of the yarn around two separate threads of the warp, and bringing the two ends of the yarn to the surface from between each space of the warp. The Turkish knotting consists in winding the two ends of the yarn round two separate threads of the warp alternately and bringing the two ends to the surface between every two threads.

The Yarn.—Almost every woolly animal and hairy beast contributes its quota to the floor covering of the Orient, and cotton hemp and linen, in some cases silk, and even gold and silver threads are used to bind together the "flowing lines of beauty" of the rug.

In the inaccessible fastness of Kirman, the vast mountain chains of Kurdistan and in the enchanting valleys of Shiraz and Kashmere and Euphrates, countless flocks of sheep yield the finest wool; not to mention the soft and downy wool raised in the shadow of Ararat in Armenia, and under the shelter of Demavend in Persia; and the camel of Arabia, and the goat of Angora and of Bokhara, vie with each other in their contribution of marvelous hair, which is transformed into bits of scintillating gems in the hands of the skillful artist of the Orient.

The wool, after being sheared, is washed thoroughly, and sorted, and carded upon crude wooden or iron rakes, and afterwards spun very much after Mr. James Bryce's description: "Each, [spinner] like the fates of Catullus, bore a distaff in her hand, with a lump of wool upon her wrist, and this they plied as they drove their flocks before them." And, when thus the wool is spun, it is made into skeins ready for the dyers' vet.

The Dyes.—To dye the yarn is a separate industry in the Orient, and the skillful dyer holds equal rank with the "dervish" and the conjurer—for, to extract beautiful dyes from animals, insects, trees, plants, roots, herbs, seeds, barks, flowers, berries, fruit, and from every imaginable thing yielding color, is no less wonderful than the feats of a howling "dervish" or the mysterious exorcism of the magician's wand.

From the old Tyrian purple, which adorned the royal vestments of the ancients, and which is a lost dye to-day, to the ordinary red madder of Asia-Minor, the extracting of dyes and coloring the yarn is a long drawn process in an exceedingly primitive manner.

The usual method is to boil in water the ingredients of a given color, with their mordant of vinegar or some other acid, in an earthen pot, till the desired constancy is

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reached, every little while the dyer smelling and tasting the liquid. Afterwards the yarn in skeins is dipped in this preparation, till the required shade is obtained, then withdrawn and dried in the sun. Often the dyed yarn is exposed to the influence of the elements for weeks and weeks, till in the laboratory of nature the dye becomes a permanent portion of the wool, and remains thus as long as the material exists.

There are some dyes which require no such treatment, others, which must be produced in an entirely different manner, but in each case the skilled dyer knows just how to obtain best results; and left to his own resources, given his own time, he usually accomplishes the desired end.

Ornamentation.—Taking a wide survey, from the sea of Marmora at the West, to the Yellow Sea at the East, Oriental rugs may be divided into two general classes, according to ornamentation: (a) geometrical; (b) floral. The development of geometrical ornamentation is attributed to the Turanian races occupying the northeastern portions of Asia, most of whose rugs bear the stamp of a more primitive type, which lead us to believe that they are more closely related to the rugs of pre-historic times. The design, popularly known as the Swastika or filfot cross is believed to constitute the basic pattern of all geometrical ornamentation in rugs—indeed, some authorities go further in the assertion that the Swastika was the first design used for ornamentation by the human race.

The floral ornamentation, a later and more intricate method, was adopted by the Aryan races, and carried to its highest development by people inhabiting the country lying between the Caspian Sea and the Persian Gulf.

The typical design of floral ornamentation is the 'flower and knop,' a conventionalized resemblance to the Egyptian lotus or the tree of life of the ancients.

An endless variety of patterns of both classes appear on rugs; they are mixed and intermingled so hopelessly, that a rigid classification according to ornamentation is almost impossible.

Purely floral patterns, such as representations of leaves, trees, blossoms, rosettes, palmettes, are strewn over or under squares, circles, stars, octagons, medallions, and various forms of the Swastika in a manner so blended, that a classification of rugs according to ornamentation resolves itself to an unsolvable riddle.

Symbolism.—It is stated by enthusiastic writers on Oriental rugs, that a fascinating array of symbolism lies beyond those charming patterns.

The rug itself typifies the universe, and its various designs the ever-changing phenomena of life. The principal coloring of the field of the rug, if red, signifies life, victory; if blue, royalty; if white, purity; if green, devotion; if black, evil; if yellow, nobility; and so on to the end.

In patterns, the Swastika signifies auspiciousness, good luck; the flower and knop, fortune, life everlasting; the circle, immortality; the star, the Star of Bethlehem; the triangle, the charm of Solomon; the square, "the square deal"; the comb, cleanliness, etc.

Among vegetation, the rose typifies love; the lily, purity; the scarlet tulip of Babylon, passion; the blossom, innocence; the fruit, fecundity; the tree, abundance, etc.

And the star of six points represents Allah!

It is reasonable to ask, however, that this endless chain of designs having come to us from the mythological past, where the light of knowledge fades in the mist of tradition, who can say positively that a certain design typifies a certain idea—and that is not "one man's guess as good as another's"?

The greatest charm of Oriental rugs lies in the simplicity of construction, in the impress of individuality of effort, and in the incomprehensible mystery of design. The manner of their making is primitive; the materials used are all home made, and the ornamentations in odd lines, angles, squares, or in grotesque likenesses of 'fish, flesh, and fowl,' the original meanings of which are forever buried in the first ages of mankind—these, and the wonder of their marvellous colorings, the secret of many being still secret and many another being entirely lost, add to the teasing witchery of the Oriental rugs.

Names.—To the uninitiated, of the many unsatisfactory peculiarities concerning the subject, the naming of Oriental rugs is the most perplexing. There is no fixed rule that would classify clearly the enormously diversified output of rugs within the vast area of about three-quarters of the continent of Asia. There are, however, six recognized geographical divisions, which include about all Oriental rugs of our days, namely: (1) Persian rugs; (2) Turkish rugs; (3) Caucasian rugs; (4) Turkoman rugs; (5) Indian rugs; (6) Chinese rugs.

Persian Rugs.—Persia, the home of floral ornamentation, and the most marvellous exponent of textile productions of the Orient, stands on the pinnacle of fame by unanimous consent. She attained this enviable position especially during the benign reign of Shah Abbas, in the 16th and 17th centuries, under whose wise encouragement she reached the golden age of the rug industry.

The Ispahan rugs, made under Shah Abbas, with their gorgeous field of "Ispahan red," decorated in tulip, rose, lotus, iris floriated, fastened together in chiselled tracery of refined meandering lines and angles at once puzzling and fascinating, established a new epoch of the rug industry, never equalled since.

And a somewhat similar pattern of the Ispahan having been evolved, the glossery of Persian rugs was enriched by another famous type of pattern called the "Shah Abbas," after the most honored monarch of Persia. The Ispahan rug, as a class, stands alone, and its specie is extinct, only a very few perfect specimens and many fragments being jealously preserved in museums or in private collections.

Persians, who ought to know best, divide their rugs into the following groups according to ornamentation mostly, which is different from the accepted division in common use abroad: (a) Kirman; (b) Herati; (c) Iran; (d) Hamadan; (e) Kurdistan.

(a) The Kirman group is subdivided into the following celebrated specimens: (1) Kashan; (2) Kirman or Kirmanshah; (3) Saruk; (4) Tabriz. The chief characteristics

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of this group lie in their extreme fineness of texture, brilliance of coloring, and purely floral ornamentation, which is carried to its highest perfection.

Mostly of modern construction, but copies of some old forms, with floriated medallions or panels or scrolls, replete with vases of flowers, and representations of birds or beasts, these rugs show the scintillating splendor of jewels in textile art; and they command high prices on the American market.

(b) The Herati group includes: (1) Meshed; (2) Khorassan; (3) Shah Abbas; (4) Feraghan; (5) Joshaghan; (6) Youraghan.

To the heart of a true son of old Iran, this group of rugs is the most precious of all, for here are preserved the glorious traditions of his forefathers; here, the holiest shrine of his faith; here, the revered name of his most illustrious Shah, and here, the true splendor of his matchless artistry. The chief excellency of this group is in the development of the leaf pattern; be it the palm leaf, the rose leaf, the lotus leaf, or the so-called river-loop design; it fills a very prominent part of ornamentation either in a curled position as in the Feraghan, or spread out on borders, corners, and medallions as in the Meshed and Khorassan, or in groups and clusters of splendid tracery as in the Shah Abbas.

(c) The Iran groups contains the following popular specimens: (1) Teheran; (2) Mihr; (3) Saraband; (4) Shiraz.

Most worthy of mention, and very much admired by all Orientals, are the Saraband and Shiraz rugs, besides the Mihr, which really is the finest grade of Saraband.

The characterizing peculiarity of these, especially of the Mihr and Saraband, is the palm leaf pattern, row upon row, on a field of red or blue and seldom ivory, each row of palm leaf facing in an opposite direction.

In the Shiraz rugs the palm leaf design, if employed at all, is used without regard to regularity or size. The Shiraz rugs show an utter disregard to conventional patterns, therefore, they are among the most interesting rugs of the Orient. Often medallions run through the centre which are decorated with flowers, leaf patterns, birds, and animals, much after the style of Kirmans. But the distinguishing points are: the salvages overcast in two or more colors with tassels here and there, and the two ends finished with pretty needlework patterns.

In the Teheran the patterns may or may not show the palm, but they are kindred rugs in all other respects.

(d) The Heriz group contains: (1) Ardebil; (2) Hamadan; (3) Bakhshaish; (4) Gorovan; (5) Serapi.

In these rugs, the medallion with its various modifications is carried out in a most pronounced fashion; especially in the Gorovan and Serapi, where the medallion stands out in barbaric outline upon a field of red, white, blue, green, or brown hues of great brilliancy.

In the Heriz and Hamadan, the undyed hair of camel plays a prominent part, often covering the whole rug, decorated with rosettes, medallions, pendants, and heavy traceries, all interwoven in bold contrasts. In the Ardebil and Bakhshaish and the Heriz proper, these striking contrasts are entirely eliminated, indeed,

these show such superb mellowness of coloring, graceful lineations and superior floriations, that they bespeak of times of the long ago.

(e) In the Kurdistan group are included the following specimens: (1) Sehna; (2) Bijar; (3) Lullé.

It would seem that the Sehna rug should not fall under this heading, for there is no similarity of style or texture to the Kurdistan; but the people of Persia class this rug as a Kurdistan.

The Sehna, so far as fineness of texture is concerned, belongs to the Kirman group, and not infrequently surpasses even the best Kashan texture of the Kirman group. Hundreds of knots are crowded in a space of one square inch with shortest cut yarn, till it becomes almost beyond belief that human fingers are capable to produce such a fabric.

The Sehna rug shows no reckless disregard to design or color; whether rosettes or palm patterns or medallions, every line is clear cut, every curve masterly rounded, and every color faithfully reproduced. The Sehna is the thinnest rug made in the Orient.

In strongest contrast to the Sehna are the Bijar and Lullé of the Kurdistan; they recognize no established pattern; accept no school of coloring, and follow no rule of texture.

Generally thick and heavy in texture, employing all the standard Persian designs without regard to fitness or uniformity of position on lustrous fields of rich and deep coloring; whether coarse or fine, heavy or light, these rugs compel admiration by reason of their extraordinary solidity.

Turkish Rugs.—In the Turkish empire live many races, peoples, and religions, which are not at all affiliated with one another—remnant nations of Syria, Babylonia, Armenia—Chaldea, Greece, Hebrew, etc.—consequently, the textile productions of this region are somewhat mixed and rather difficult to classify. It appears, however, that the Turkish detached mode of ornamentation repeated on some parts of rugs, and the generous use of both floral and geometrical designs usually seen in all Turkish products, would give them a certain distinction; add to this the very popular pattern found in the praying rugs, and Turkish rugs become an individual class in the family of Oriental rugs.

Moreover, most Turkish rugs are coarser than Persians, their pile being longer, looser, thicker, and softer.

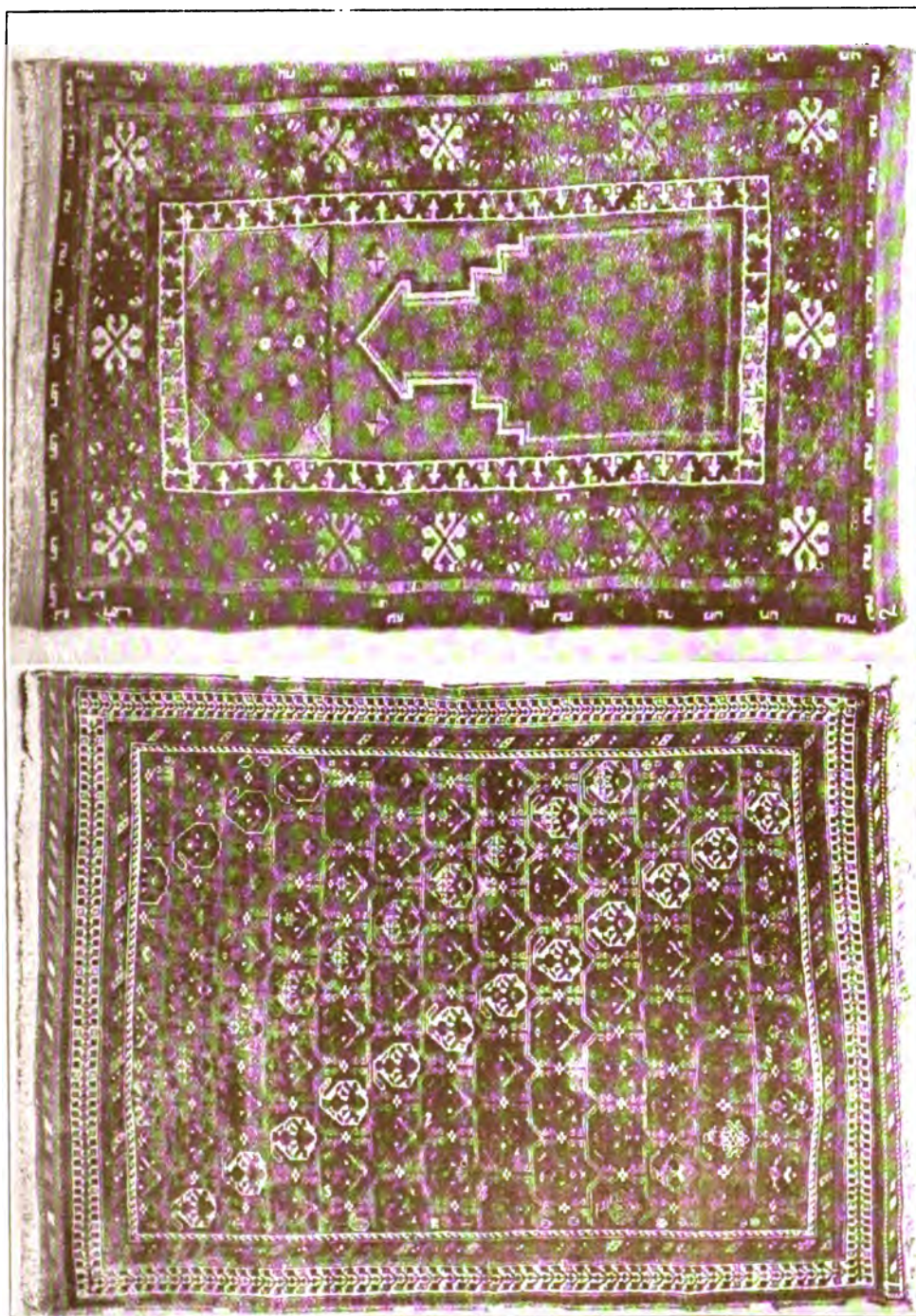
The people of Turkey divide their rugs into the following principle specimens: (a) Gheordez (Yordez); (b) Koulah; (c) Ladik; (d) Melez; (e) Berghama; (f) Koniah; (g) Kir-Shehir; (h) Kutahia; (i) Mousul; (j) Kurd; (k) Yuruk; (l) Anatolian.

(a) In conception of design, execution of workmanship, and combination of coloring, the Gheordez stands first in all Turkish rugs, and is most highly praised by Turk, Greek, Armenian, European, and American alike.

Usually made of praying-rug design, the field has a solid coloring of ivory, blue, red, sometimes green, with the niche or dome resting on two ornamented columns; but at times the columns being absent, the dome is supported by highly conventionalized patterns of the tree of life.

A wide border, generally of the same color-

RUGS.



Turkish Rug.

Persian Rug (Shiraz).

RUGS

ing as of the field, is decorated with flowers and configurations so clustered as to form a superb square, which is repeated on the four sides of the rug, and frequently on the panels, over and under the enclosure of the praying niche pattern.

Two or several narrow borders in detached patterns surround the principal border; and on the two upper corners filling the trigonal spaces of the praying dome, are distributed figures bearing a resemblance to the main border. Often a bejeweled lamp hangs down from the center of the dome.

The colorings of the Gheordez of old are impossible to describe appropriately, and it might be added with truth, equally impossible to reproduce in paint.

(b), (c), (d) Koulah, Ladik, Melez, these three, are kindred rugs to the Gheordez, but they are not equal to the latter.

In Koulah, the praying dome is often indented or otherwise misshapen, and the field, instead a solid color, is decorated with patterns. It is marked also with several narrow stripes, for border, with startling contrast of colors.

The Ladik may be called a better rug than the Koulah, for it often possesses beautifully subdued greens, deep reds, blues, all blended attractively.

The Melez might be named as a twin sister to the Ladik, for it has all her characteristics, and only the trained eye can properly distinguish between them.

(e), (f) Berghama and Koniah rugs generally show medallion designs and a field well covered with geometrical patterns; they have also wide attractive borders covered with floral decorations. In size these rugs are made nearer square than other Turkish productions, with a heavy, silky pile and very attractive colorings.

(g) The Kir-Shehir products, praying-rug design or other, generally small rugs possess much resemblance to Ladik and Melez, they are, however, coarser rugs with brighter colorings and with unpleasant contrasts.

(h) Kutahia or Kutais, is a longer rug than the foregoing specimens with no special characteristic in design or coloring. A satisfactory rug usually, with silky surface, pleasing design and fine coloring.

(i), (j), (k) Mousul, Kurd, Yuruk. Strictly, these three grades do not belong to the Turkish family of rugs, yet neither could they be classified under the Persian group, and since the provinces in which they are made fall under Turkish rule it is proper to call them Turkish.

In design, in texture, in workmanship, these are the 'heavy-weights' in rugs. There is coarseness, boldness, and a wild strength in these rugs, which indicates the mountain, the desert, and the ravine; usually made of good wool and of good colorings (often exceptionally good), they lack the refinement of a Herati or the exquisiteness of a Gheordez.

The Kurd and the Yuruk especially, show an utter disregard to regularity of design or texture; sometimes long and shaggy like the matted wool of a sheep, they defy any accepted school of rug making.

(1) Anatolian.—There are several other grades made in Turkey, especially small mats, which are covered by this name. The Anatolian rug is usually of heavy quality and not

very fine, but in coloring surpasses many others. The wool is exceedingly soft, and the colors frequently of primary dyes, and when mellowed by age, it develops a sheen which rivals silk productions.

Caucasian Rugs.—In Caucasian rugs, the geometrical ornamentation is carried to its perfection. All conceivable designs in line are employed with great profusion and bewildering effect. Generally there is one principal color to which all other colors are subjected in clear cut designs, sometimes without shadings, giving the effect of inlaid stonework.

In texture Caucasian rugs are medium, although there are some exceedingly fine specimens made, but these are exceptional.

In size these rugs are not very large, sometimes they are made long and narrow, but mostly of medium size.

In designing they show star shapes, circles, fretwork, insect shapes, diamonds, triangles, various forms of the Swastika, squares, medallions, dragon designs, etc.

These are the following principal well-known kinds of rugs made in Caucassia: (a) Daghestan; (b) Kabistan (Kuba); (c) Shirvan; (d) Darbent; (e) Karabagh; (f) Kazak; (g) Chichi; (h) Circassian; (i) Kashmir (Soumak).

The Daghestan, the Kabistan, and the Shirvan are rugs made on similar lines. Their colors, designs, and texture are not different from each other, except the Kabistan, which is usually of finer construction. The geometrical elongated star and the Swastika and other lineal decorations are common to all, with beautifully vivid colors attractively arranged.

The Darbent rug shows a strong, barbaric nature like that of the Kurd and Yuruk, only in the Darbent there is more uniformity of design, and the texture is not so coarse.

The Karabagh rug shows more of Persian mode of designing than any other Caucasian rug. Upon its black or brown field are strewn at regular distances, magnificent delineations of leaf and flower patterns in various shades of tan and old magenta colors—but this is the Karabagh of olden times. The modern product is a mixture of homely designs, crude dyes, and coarse weaving, showing a careless haste of workmanship.

The Kazak rugs are the heaviest of all Caucasians and different in floriation. It appears, the makers of these rugs have endeavored to develop the gruesome in design, for on their products are shown various grotesque shapes of the dragon and other creeping creatures with startling effect. One distinguishing point of Kazaks is in their size which is nearer square than any other Caucasian product; another, is in the peculiar quality of the twisted yarn, which, when untwisted after years of usage, is divided into hundreds of fine ends, effecting the surface of the rug like a smooth velvety lawn.

Chichi rugs are made fine usually, and differ from other Caucasians in ornamentation. On a dark or light colored field are distributed regular patterns in cut squares or rectangular forms, giving the appearance of latticed panel.

Circassian rugs depart entirely from Caucasian mode of ornamentation. These are among the choicest, if not the choicest products of this region. A favorite design consists in pattern of superb flowers in full bloom, or

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foliage artistically clustered and connected one with the other by graceful long lines.

Kashmir (Sumak or Shamakha) rugs are devoid of nap, they are made what is commonly known as the flat stitch style like the old Kashmir shawls of India from which they derive the name. In design they are typical Caucasians, and by reason of the absence of the nap, they show their designs in bold relief, clear cut, and prominent. The long ends of the yarn, left on the back, give weight and softness of texture.

Turkoman Rugs.—There are two divisions of the Turkoman rugs: Western and Eastern. In the Western Turkoman rugs the chief color, universally employed, is red with all its shades and kindred colorings, and the principal design, the octagonal or Bokhara; embracing the following well-known specimens: (1) Bokhara; (2) Afghan or Khiva; (3) Yomud; (4) Bushir; (5) Beluchistan.

Of these, Bokhara rugs are the finest and most valuable. It is impossible to mistake the Bokhara after once seen. The octagonal device, in shades of blues, ivory, and reds, is stamped on every Bokhara upon a field of some shade of red. The octagonal pattern is divided into four, with the diagonal sections resembling each other. They are the finest of all Turkomans in texture and sometimes so fine that they rival the best productions of Persia.

The praying-rug of this class preserves the general characteristic color of red. It, however, shows no octagonal device; there is the usual dome pattern in a more pointed shape near the top; and the whole rug, usually about four feet by five, is divided into four sections, decorated with highly conventionalized devices of the Swastika.

Afghan or Khiva rugs, made of coarser texture and of larger size, adhere to the Turkoman red and octagonal pattern most faithfully—in the large regularly arranged octagon is often seen clover leaf and sometimes a portion of dragon designs. Rich in coloring, heavy in pile, these rugs frequently mellow into lustrous and velvety fabrics.

The Yomud rugs are of darker shades of the maroon; and the detached regular octagon is transformed into an elongated diamond design fringed with dragon claws or Swastika devices. The Yomud usually is of very fine texture and is made in large size.

Bushir rugs classed, herein, are Turkoman only in coloring and texture. They show no octagonal pattern; often being decorated with palm devices; sometimes with Herati designs, and with ornamentations generally found in Caucasians. Made in rather longish sizes, loose texture, strong, silky, and desirable.

Beluchistan rugs are another class of the Turkomans which bear no resemblance to the Bokhara. Generally small in size, they deviate from the red shades often, and show subdued shades of maroon, blue, ivory, camels' hair, and rarely green. In design they employ the floral as well as geometrical forms. The general effect of Beluchistans is dark.

Eastern Turkoman rugs may be subdivided to: (1) Ganji or Genghis; (2) Samarkand; (3) Kashghar; (4) Yarhand.

The Ganji rugs are made by Turkoman nomads, of goats' hair or wool with long silky texture, the principal color being white or

yellow, on which are spread at regular distances rather crude geometrical devices.

Samarkand rugs reveal Chinese characteristics in coloring and design—usually of yellow, tan, or red and blue, they have several round figures intersected with strange floral designs and geometrical patterns.

The fret decoration is pronounced on their borders. Heavy and rather coarse in construction these rugs are attractive by reason of their simplicity of designing and uniqueness of coloring.

Kashghar rugs, coarse in texture are stolid in design and simple in coloring. Often only three different colors appear—a solid color for the field and another solid color for the simple geometrical design and a third, to separate the lines and to mark the borders. These and the Yarkhand rugs similar to these, rarely leave their native places, the easternmost part of Turkestan.

Indian Rugs.—Strictly speaking India sends out only large carpets, the manufacture of which is in the hands of European and American firms, who have established large centers of production in the Punjab, Kashmir and Madras districts, commonly known as Agra, Lahor, Amritsar, Mirzapur, Kandahar, Ardahan, etc. Arbitrary names these last, named by the manufacturers themselves without regard to location.

These American and European houses not only control the output of rugs but also their ornamentation and coloring; they make rugs to order, according to the ordered colors and patterns required by their customers. Thus individuality and character is altogether wanting in these productions, albeit they are made to endure, being heavy, closely made and of attractive colorings.

Mr. Ruskin sums up the deteriorating effect of European control on the Indian rugs in the following manner—"Modern commercialism has laid its poisonous trade upon this useful industry since the days when I was a young man and to-day it is almost ruined as an art."

It may be added that to-day "this useful industry . . . as an art" is altogether ruined with no hope of its revival.

Chinese Rugs.—It is a matter for the historian to decide whether or not the Chinese are the original rug makers of the world; it is evident however that rugs were made in China a very long time ago and some of them of surpassing beauty; thus the white silk rug taken to Mecca as a covering for the holy shrine of Kaaba, antedated by hundreds of years the appearance of the great prophet of Arabia.

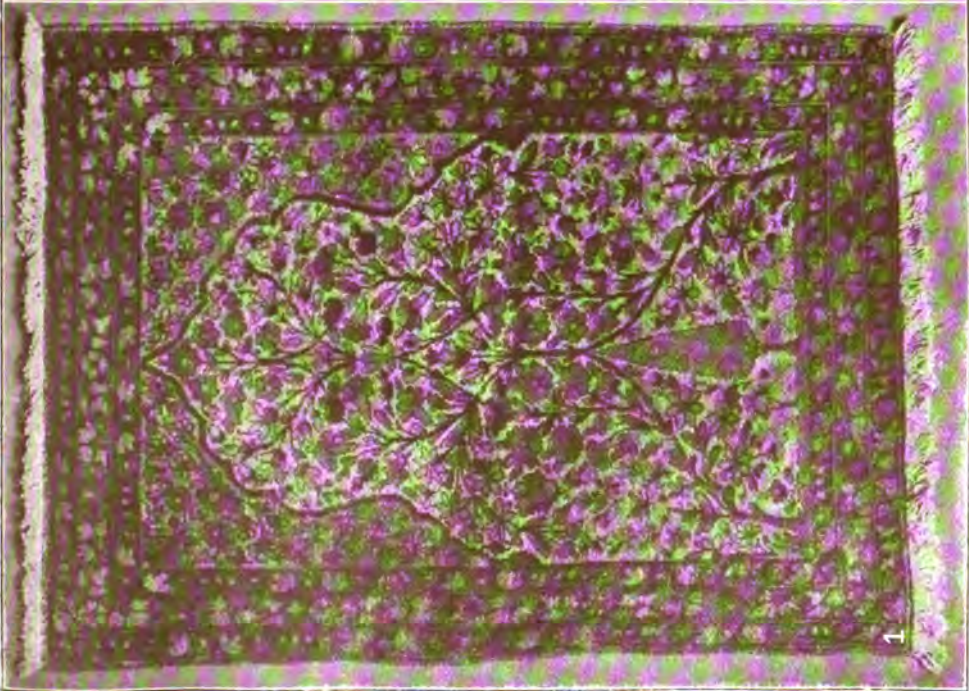
Chinese rugs form a distinct type, their designs consist of all kinds of odd geometrical devices, all imaginable curves and angles and many quaint configurations of the Swastika or the lotus flower which are distributed with unique formations on fields of yellow, blue, red, fawn, gold, and tan in all their exquisite shades marvelously blended.

Chinese mode of ornamentation may be called the Kaleidoscope of texture. Generally of long, soft wool or silk or camel's hair these rugs while not made as fine as some Persian rugs, still they reveal masterly skill in texture with iridescent sunset colors and magnificent sheen. They are among the most valuable of all Oriental rugs and among the rarest on the

RUGS.



Caucasian Rug.



Indian Rug.

RUGS—RUISDAEL

European or American market; and they command highest prices.

Kilims.—Kilims, while products of the Orient, are not rugs, for they possess no pile and their mode of construction is different.

Kilims resemble the Kashmir or Shemakha rugs and are made in the same manner, that is on the flat stitch plan, with this difference however that while the loose ends of the yarn are left on the back of Kashmir rugs, in Kilims they are wound around the woof, and in changing the yarn to change the color also a separate warp thread is taken up, thus leaving a small oblong open space between the two stitches. Kilims thus made present the open work effect in texture.

Kilims are of lighter weight, often both sides made alike and are not appropriate for floor coverings. They are the tapestries of the Orient, and in whatever district made, they follow the usual rug pattern of that district. The finest Kilims are made in Sehna, where the finest rugs are made, in Persia; and also in Bokhara. Small Kilims made in Turkey are often called Kiz-Kilim, woven by the hands of Turkish maidens for purposes of dowry or devotion, or for presents to their marriageable friends and relations, they are therefore, highly decorative and often with unusually beautiful designs. Kilims are made also in Caucassia and Kurdistan known as Shirvan and Kurd Kilims respectively.

In the Orient their use is manifold—as rugs, hangings both for doors and walls, and for tents, as mantles by day time and covering by night for travelers; made for bags and covering for bags, and also for covering of the person; they serve for other conveniences entirely unknown in civilized communities.

B. PESHMALYAN.

Rugs, Weaving of. The commerce in Oriental rugs, especially those from Persia, Russia and Turkey, is very considerable in the United States. A few come from India and China, and some are woven in Afghanistan and Beluchistan. While there is a large production of rugs of various kinds in America the imported rugs continue to hold high favor among American buyers. Many of the costly Eastern rugs are as simply woven as a Navajo blanket, or even a rag carpet. The process is in many cases, almost identical, the variation being only in closeness or fineness of warp and arrangement of color. The Navajo blanket is a product of Indian manufacture. The manufacture of rugs in the United States is an industry of considerable importance. A great variety of weaves is produced,—woolen, cotton, and grass rugs, made in some cases after European models and methods and in others after original designs and methods of construction, both as to the machinery used, the dyeing of the fabrics, and the designs. Grass rugs for the country house have won recent prominence in our domestic commerce. Some of these are made of tough fibres and others of less durable material. Some have their colors woven into the mesh and some have stencilled designs in fast colors.

Another phase of the weaving of rugs in the United States is their manufacture in the home. Rag carpets have been made and used in farm houses for many generations, but of late there has been a general demand, especially in country houses, for home-made piazza rugs,

bedroom rugs and rugs for general use. An authority on the home weaving of rugs is Mrs. Candace Wheeler, whose recent work on 'How to Make Rugs' is a practical hand book. The *Onteora* rug, the *Lois* rug, the *Isle La Motte* rug, the *Lucy* rug and other home-made designs are described. The pattern, the dyeing, and braiding the fringe of the border all are featured and described. This writer states that "the cumbrous old woollen loom is still doing a certain amount of work in every country neighborhood, and it is capable of a greatly enlarged and much more profitable practice. I find very little, if any difference in the rugs woven upon these and the modern steel loom. It is true that the work is lighter and weaving goes faster upon the latter, and where a person or family makes an occupation of weaving, it is probably better to have the latest improvements, but it is possible to begin and to make a success of rag-rug weaving upon an old fashioned loom." In the matter of pattern and coloring it is stated that the *Onteora* rug is made by using a proportion of a half pound of blue rags to the two and a half white required to make up the three pounds of cotton filling required in a six foot rug. The side border in the *Lois* rug is made upon the same blue warp, is separately woven and afterward added to the plain white rug with blue ends. And she describes further details of her method. Many of the rugs described by Mrs. Wheeler are washable. Her work is also the building up of neighborhood industries in domestic rug making, a work which has taught both economy and art.

The larger subject of the domestic manufacture and commerce in rugs made in the United States may be broadly considered under the general subject of Carpets, (q.v.). The principal varieties of carpets now in use are the Turkey, the Axminster, the Brussels, the Wilton, the Venetian, the Dutch, the Kidderminster or Scotch, the Whytock's tapestry and velvet pile, and the printed felt carpet. Generally speaking, rugs, though made in England or the United States, follow somewhat these same designations and are similar in appearance though made on the most modern looms. A very beautiful fabric has also been introduced, called the Patent Wool Mosaic.

Ruhmkorff, room'kôrf, **Heinrich Daniel**, German inventor: b. Hanover 1803; d. Paris 21 Dec. 1877. He removed to Paris in 1839, where he continued to reside. In 1851 he invented the induction coil which bears his name.

Ruisdael, rois'däl, or **Ruysdael**, **Jacob van**, Dutch painter: b. Haarlem 1626; d. there 1682. He was the son of a painter, and probably studied art under his father and an uncle, who was also a painter. In 1648 he entered the guild of his native city, and some nine years later settled in Amsterdam, where he received citizen rights in 1659. He appears to have traveled throughout his native country and in parts of Germany and Switzerland. Ruisdael was not much appreciated during his lifetime, but is now ranked among the greatest of the Dutch painters of landscape. His pictures, comprising well-chosen forest, waterfall, shore, mountain, and similar scenes, are often of a melancholy, but always of a deeply poetical character. The figures in them were painted by Berchem, Van de Velde, Van Ostade, Wouwerman, Lingelbach, and others. All the chief European

RULE BRITANNIA—RULES OF THE ROAD

galleries contain examples of his work, the number in the National Gallery being 12. Consult: Michel, 'Jacob Van Ruisdael et les Paysagistes de l'Ecole de Harlem' (1890).

Rule Britannia, the national song of Great Britain, the joint production of James Thomson and David Mallet, first performed before Frederick, prince of Wales, at Cliefden House, 1740. See NATIONAL SONGS.

Rules of Faith, the phrase-worn *regula fidei* of polemical theology is the term applied to what is considered the code from which the Christian faith is to be derived, and has been in use since the 2d century. The items of the creed differ in the various sects. The Reformers held that the Scriptures alone could be safely accepted as a rule of faith. Roman Catholics hold that the testimony of the Church is the true rule of faith, regarding the Church as the vital and infallible organ of the teachings of Jesus Christ under the guidance of the Holy Ghost, while they look upon the Bible as the divinely inspired word of God to be interpreted by the Church. Protestants acknowledge the authority of Christ, his apostles, and all inspired writers, but deny that any doctrine not contained in the Scriptures has any binding authority. Certain members of the English Church admit what they call the consent of the fathers as authoritative interpretation of the Scriptures.

Rule Nisi, nī'sī, or Rule to Show Cause, in English and United States law, an order granted by the court on an interlocutory application (formerly always *ex parte*), directing the party opposed to the applicant to do or abstain from some act unless (*nisi*) he can show cause why the order should not be obeyed. If cause is shown, the order is "discharged," otherwise it is made "absolute."

Rule of Three. See PROPORTION; ARITHMETIC; ARITHMETIC, HISTORY OF.

Rules of the Road, the official designation of regulations adopted by national or international authorities for the management of vessels in storms, fogs, or other danger. Under act of the United States Congress, in 1896, the rules already established were considerably changed to comport with the schedule to be observed by vessels of all civilized nations on and after 1897. These rules apply also to inland waters, excepting the Great Lakes, for which a special set has been devised. The following is a synopsis of the new rules: "Vessels are in the first place cautioned against showing any other lights than their distinguishing ones in such a way as to permit any possibility of confusion. An additional white light is, however, given to a steam vessel under way to be carried at least 15 feet lower than the one now provided for, and forward of its vertical line. A vessel which is towing another vessel or barge is also allowed a small white light to be carried aft, and in such a position that it shall not be visible forward of the beam, which may be used for the towing vessel to steer by. The following regulations are also provided for small vessels:

"1. Steam vessels of less than 40 tons shall carry (a) in the fore part of the vessel, or on or in front of the funnel, where it can best be seen, and at a height above the gunwale of not less than nine feet, a bright white light

constructed and fixed as prescribed in article two (a), and of such a character as to be visible at a distance of at least two miles. (b) Green and red side lights constructed and fixed as prescribed in article two (b) and (c), and of such a character as to be visible at a distance of at least one mile, or a combined lantern showing a green light and a red light from right ahead to two points abaft the beam on their respective sides. Such lanterns shall be carried not less than three feet below the white light.

"2. Small steamboats, such as are carried by seagoing vessels, may carry the white light at a less height than nine feet above the gunwale, but it shall be carried above the combined lantern mentioned in subdivision one (b).

"3. Vessels under oars or sails of less than 20 tons shall have ready at hand a lantern with a green glass on one side and a red glass on the other, which, on the approach of or to other vessels, shall be exhibited in sufficient time to prevent collision, so that the green light shall not be seen on the port side nor the red light on the starboard side.

"4. Rowing boats, whether under oars or sail, shall have ready at hand a lantern showing a white light which shall be temporarily exhibited in sufficient time to prevent collision. Additional regulations are provided for pilot vessels on duty at their stations as follows: On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the green light shall not be shown on the port side, nor the red light on the starboard side. A pilot vessel of such a class as to be obliged to go alongside of a vessel to put a pilot on board may show the white light instead of carrying it at the mast-head, and may instead of the colored lights above mentioned, have at hand, ready for use, a lantern with a green glass on the one side and a red glass on the other, to be used as prescribed above. A vessel in or near a fair-way, when aground, is required to carry in addition to it, the two red lights which signify a vessel not under control but not desiring assistance. A steam vessel under sail only, but having her funnel up, shall carry forward where it can best be seen, one black ball or shape, not two feet in diameter.

"The manner of fog signaling is also more definitely fixed as follows: Article 15. All signals prescribed by this article for vessels under way shall be given: (1) by "steam vessels" on the whistle or siren. (2) By "sailing vessels" and "vessels towed" on the fog horn. The words "prolonged blast" used in this article shall mean a blast of from four to six seconds' duration. (a) A steam vessel having way on her shall sound, at intervals of not more than two minutes, a prolonged blast. (b) A steam vessel under way, but stopped, and having no way on her, shall sound, at intervals of not more than two minutes, two prolonged blasts, with an interval of about one second between. (c) A sailing vessel under way shall sound at intervals of not more than one minute, when on the starboard tack, one blast; when on the port tack, two blasts in succession, and when with the wind abaft the beam, three blasts

RULING MACHINES—RUMANIA

in succession. (d) A vessel when at anchor shall, at intervals of not more than one minute, ring the bell rapidly for above five seconds. (e) A vessel when towing a vessel employed in laying or in picking up a telegraph cable, and a vessel under way, which is unable to get out of the way of an approaching vessel through being not under command, or unable to maneuver as required by the rules, shall instead of the signals prescribed in subdivisions (a) and (c) of this article, at intervals of not more than two minutes, sound three blasts in succession, namely, one prolonged blast followed by two short blasts. A vessel towed may give this signal and she shall not give any other. Sailing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals, but, if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.³ See COLLISION.

Ruling Machines, in blank-book manufacture and bookbinding, are instruments used for ruling paper, metal, etc. The first machine of this kind was invented by a Dutchman, resident in London, in 1782, and was subsequently greatly improved by Woodmason, Payne, Brown, and others. F. A. Nobert devised a ruling machine in 1845 for the production of microscopical test plates, diffraction gratings, and micrometers, etc., and more recently Benjamin Day, a New York artist, patented one for use by artists.

Rum, a distilled liquor obtained from the fermented juice of the sugarcane or molasses. Rum owes its flavor to a volatile oil and butyric acid, a fact which has been taken advantage of to prepare a butyric compound called essence of rum to enable the spirit-dealer to manufacture a fictitious rum from malt or molasses spirit. The color is usually imparted after distillation by adding burnt sugar or caramel.

Rum, Romanism, and Rebellion, in American political history; at a meeting of clergy, in which all denominations were supposed to be represented, held in the Fifth Avenue Hotel, New York, during the Presidential campaign of 1884, in the interest of the Republicans, Rev. R. B. Burchard described the Democrats as the party of "Rum, Romanism and Rebellion." This remark was unfortunate for the Republicans, and aided in a great measure to win the election for the Democrats.

Rumania, roo-mă'ni-ă, or Roumania, a kingdom of southeastern Europe, bounded by Austria-Hungary, Russia, the Black Sea, Bulgaria, and Servia. Area, 50,720 square miles. It comprises the provinces of Moldavia and Wallachia, prior to 23 Dec. 1861, Danubian principalities; to these have been added the province Dobrudja on the Black Sea. The principal towns are Bucharest, the capital; Jassy, Galatz, Braila, Botosai, Ploësti, Craïova, Berlad, Focscani.

Topography.—The surface consists mainly of undulating and well watered plains of great fertility: from the Carpathian Mountains on the north and west borders, where the summits range from 2,600 feet to 8,800 feet, they gradually slope downward to the river Danube which for 595 miles flows through Rumanian territory, and forms the major portion of the southern

boundary with Bulgaria. The entire kingdom is in the basin of the Danube, the chief Rumanian tributaries of which are the Alt or Aluta, the Arjish, Jalomnita, Buzeo, Sereth, Berlad and Pruth, the last forming the eastern boundary with Russia. The Danube forms a number of marshy lakes as it approaches the alluvial region of the Dobrudja, mostly a land of steppes and marshes, unhealthy and uncultivated, through which the Danube discharges itself into the Black Sea by the Saint George, Sulina, and Kilia channels.

Geology, Natural Resources, etc.—In the region of the Carpathians, the geology is of the Tertiary period practically completed at the end of the Miocene period, and almost entirely composed of primitive rocks. The kingdom possesses considerable mineral wealth; rock-salt abounds in the vicinity of the Carpathian Mountains, and the salt mines of Wallachia are apparently inexhaustible. Petroleum and asphalt are abundant; a great quantity of saltpeter is produced, chiefly in the northern part of the country; sulphur is found in more limited quantities. The only metal of importance is copper, which has been worked to some extent; gold is washed from the sands of several streams. About one sixth of the surface is covered with forests of oak, fir, beech, and other valuable timber trees.

The fauna includes stags, wild boars, bears, wolves, foxes, wild goats, hares, and martens; while fish abound in the rivers. The climate is subject to greater extremes than at the same latitude in other parts of Europe; the summer is hot and rainless; the winter, sudden and severe, the Danube and its tributaries being regularly frozen for about six weeks; there is almost no spring, but the autumn is long and pleasant. Rumania is an essentially agricultural and pastoral state, fully 70 per cent of the inhabitants being directly engaged in husbandry. The chief cereal crops are maize, wheat, barley, rye, and oats; tobacco, hemp, and flax are also grown; and wine is produced on the hills at the foot of the Carpathians. Cattle, sheep, and horses are reared in large numbers.

Manufactures, Commerce, etc.—Since the passing of the law in 1887 for promoting national industries, some progress has been made in manufactures, chiefly along the line of domestic commodities. Trade is fairly active, but is almost entirely in the hands of foreigners; the internal trade is chiefly carried on by Jews, who are subject to certain disabilities. The chief exports are grain (especially maize), cattle, timber, and fruit; the chief imports, manufactured goods, coal, etc. Germany, Great Britain, and Austria-Hungary appropriate by far the greatest share of the foreign trade, the bulk of which passes through the Black Sea ports. In 1901 the exports were valued at \$70,766,175, the imports at \$58,487,172; in 1900 and 1901, the value of the exports for the first time exceeded that of the imports. In 1902 there were 2,295 miles of state railway, 4,344 miles of telegraph lines, and a rapidly extending telephone system. The government monopolizes also salt and tobacco. The French decimal coinage has been introduced, the franc being called *leu* (pl. *lei*), the centime *bari*. The metric system of weights and measures has also been officially recognized, but a diversity of local standards is still common.

RUMANIA

Government.—Since 1881 the ruler of Rumania has had the title of king, in accordance with the decision of the Rumanian Parliament. Previously the title was prince, or in Rumanian *Domnu* (L. *dominus*, lord). The present ruler was elected by the people, but the dignity is hereditary. There are two legislative houses, a senate of 120 members elected for eight years, and a chamber of deputies of 183 members elected for four years. The members of both chambers are chosen by indirect election, the first voters choosing electors, and these in their turn the deputies. A deputy must either belong to a learned profession, to a military or civil service, or have an annual income of about \$2,000, and must be 25 years of age. All citizens of full age and paying taxes are electors. The sovereign has a suspensive veto over all laws passed by the two chambers. The executive is in the hands of the sovereign assisted by a council of seven members, the heads of the departments of the interior, of finance, of war, of foreign affairs, of justice, of agriculture, commerce, and public works, and of public instruction and worship. For purposes of local government Wallachia is divided in 17, Moldavia into 13, and Dobrudja into two departments, each administered by a prefect, a receiver of taxes, and a civil tribunal. Judges are removable at the pleasure of the superior authorities. The legal codes are founded on the civil law and customs of the two provinces; but though several reforms have been effected in the system of jurisprudence much yet remains to be done, especially in the administration of the law, which is said to be very unsatisfactory and corrupt. The budget estimates for 1909-10 were £17,427,473 revenue, expenditure, £18,039,907. The public debt in 1909 amounted to £59,310,089.

Army and Navy.—The military forces of Rumania are divided into five classes: (1) the permanent army, with its reserve; (2) the territorial army, with its reserve; (3) the militia; (4) the civic guard; and (5) levies *en masse*. Every male inhabitant, from the age of 21 to 46, must serve three years in the permanent army in active service and five years in its reserve, or five years in the territorial infantry and three years in its reserve. The active service in the cavalry of the territorial army lasts four years, and is followed by four years in its reserve. Whether a young man enters the permanent or the territorial army is determined by lot. Those who for some sufficient reason have not been subjected to the conscription form part of the militia, and those who have finished their term in the permanent or the territorial army also enter the militia till the age of 36. After this age, in the country they enter the levies *en masse*, in the towns the civic guard. The total strength in times of peace of the permanent army is 60,000 men and 3,280 officers, with 390 pieces of ordnance. The territorial army has a total strength of 72,000 men. The militia has a total strength of 33,000 men. The effective force of the civic guard and the levy *en masse* is not definitely fixed; but altogether Rumania can put into the field about 200,000 men. The navy is insignificant, there being only one armored cruiser of any consequence.

Ethnology and Population.—The Rumanians claim to be the descendants of a colony of Romans located here by the Emperor Trajan, and

call themselves *Romeni*; hence the name of Rumania, which is now universally adopted by the natives as the name of the united principalities. The race is, however, a mixed one, being modified by Greek, Gothic, Slavic, and Turkish elements. This mixture makes itself apparent in their language, three fourths of the words of which, however, are almost pure Latin; among words in common use are, *apa* (L. *aqua*), water; *pane* (L. *panis*), bread; *alby* (L. *albus*), white; *negru* (L. *niger*), black; and so on. The conjugations also of the verbs, which are four in number, correspond exactly to the four conjugations in Latin. For a long time Greek was the language spoken by the court and the upper classes; but latterly this language has been largely superseded by the French. The population of Rumania, according to the latest census, was 6,300,000, among whom the Rumanians proper numbered 5,500,000. The Rumanians are in general strong and stoutly built, with black hair, brilliant eyes, and a complexion similar to that of the Italians. Besides the Rumanians proper there are about 300,000 Jews, 200,000 Gypsies, 85,000 Slavs, besides Germans, Magyars, Greeks, etc. There are also large numbers of Rumanians inhabiting Hungary, Transylvania, Bessarabia, and elsewhere.

Sociology.—Since the introduction of railways great changes have taken place in the condition of the people. The peasants were never, properly speaking, serfs, but being compelled to work gratis for the proprietor a certain number of days every year they became fixed to that part of the country in which they were born. They are now not only perfectly free, but each head of a family received during the late Prince Couza's reign a small portion of land, of which he became absolute proprietor, the landlord having been compensated by receiving bonds bearing 10 per cent interest. Their dwellings are generally of a wretched description. Many of the towns are merely agglomerations of large houses, the residences of the boyards, surrounded by the huts of their dependants. The streets are ill paved, or, as is most generally the case, not paved at all, and are usually filthy; the roads, of which there are too few, are in most cases in a wretched state. Agricultural labor, the chief employment of the inhabitants, is cheap, as most of the laborers are so poor that they engage for work to be done three years afterward, in order to obtain advances of money. More than three fourths of the population are peasants. Handicraftsmen are comparatively few in number, as the peasant usually builds his own house, and makes his own furniture and other utensils. In Moldavia there are about 3,000 boyards, besides an extensive lower nobility; in Wallachia they are still more numerous, every twenty-eighth man being a nobleman. There is no native middle class, and the higher ranks of society have only the law open to them as a profession. The commerce of the country is in the hands of the Jews and foreigners. The staple food of the inhabitants is maize; the common beverage is wine, which is produced in great quantities though mostly of inferior quality. This, however, is owing altogether to the manner in which it is made, and, as already stated, some good wine is also produced. The common people are good-humored, sober, and cleanly; murder and robbery are almost unknown.

RUMANIAN LANGUAGE AND LITERATURE

Religion and Education.—The established religion is that of the Greek Church, to which about 97 per cent of the population belongs. At the head of the clergy are the metropolitan archbishops of Moldavia and Wallachia, the latter of whom is primate of Rumania. Each bishop is assisted by a council of clergy, and has a seminary for priests. In 1863 the national finances were so low that the government was compelled to appropriate the estates of the monasteries, whose revenues amounted to about a third of that of the state, allowing in return a sum of about £700,000 for the support of the religious communities. It was determined that the balance should be devoted to the support of schools, hospitals, the relief of the poor, etc. Rumania possesses 4,000 elementary schools, 54 high schools, eight normal schools, and two universities, besides other special schools. Education is compulsory, but is still very backward.

History.—Rumania formed an important part of the Dacian territory which was conquered by Trajan and formed into a Roman province in 106 A.D. It became the battle-field of the Goths, Huns, Bulgarians, Magyars, and Poles, who in succession held for a more or less lengthened period possession of the country. All these races left some traces of themselves among the Romanized Dacian inhabitants, thus contributing to form that mixed people who in the 11th century were converted to the Christianity of the Greek Church. About that epoch the Kumans, a Turkish tribe, established in Moldavia an independent kingdom. Two centuries later it fell into the hands of the Nogai Tartars, who so desolated the country that only in the mountains and forests was left any trace of the native population. Toward the end of the 13th century Radu Negru of Fogarash, a petty Transylvanian chief, took possession of part of Wallachia, divided it among his boyards, founded a senate of 12 members and an elective monarchy, and in the course of time conquered the whole province. About the middle of the following century Bogdan, a Hungarian chief, made a successful attempt to re-people Moldavia. Struggles for the ruling power, civil and foreign wars, and invasion by the Tartars induced the Rumanians in the beginning of the 16th century to place themselves under the protection of the Sublime Porte, and the boyards were gradually deprived of their power to elect their own ruler, whose office was bought and sold at Constantinople. Woiwodes of various nationalities were now successively appointed, but their rule proved inefficient in establishing peace and subjection to the sultan, as the boyards never lost an opportunity of making known their dissatisfaction. One of the most distinguished foreigners was Basil Lupulo, a Greek of Epirus, who promoted civilization and learning, but was deposed in the middle of the 17th century. From 1732 to 1822 the country was governed, or rather misgoverned, by Fanariot princes, who merely farmed out the revenues, enriching themselves and impoverishing the land. A considerable number of the boyards, through intermarriage with the Fanariots, were more than half Greek by descent; the court language was Greek, and the religious and political sympathies of the country lay in the same direction. In 1802 Russia succeeded in establishing a sort of protectorate over the principalities, and in 1821 a desper-

ate struggle to throw off entirely the Russian authority almost desolated the land. In 1821 the sultan was compelled by Russia to allow the princes of the provinces from native rulers, years later to allow them to retain their offices for life. In 1853 Russia took military possession of the provinces, but was compelled at a short time to retire, Turkey having received the assistance of France and England. In the Treaty of Paris at the close of the Crimean war in 1856 it was agreed, among other things, that the principalities of Moldavia and Wallachia should continue to enjoy, under the suzerainty of the Porte and under the guarantee of the contracting powers, the privileges and immunities of which they were in possession; and that no exclusive protection should be exercised over them by any of the guaranteeing powers. The Porte engaged to preserve to the principalities an independent and national administration. In 1858 the principalities were united under one ruler, Colonel Couza, who took the title of Prince Alexander John I. In 1861 Moldavia and Wallachia were formally brought under one administration. A revolution which broke out at Bucharest in February 1866, forced Prince Alexander to abdicate, after which the representatives of the people elected as ruler Charles, son of the late Prince Charles of Hohenzollern-Sigmaringen. In the Russo-Turkish war of 1877-8 the principality sided with Russia, but in spite of the important services which it rendered in that war, it was compelled at the close of the war to retrocede the portion of Bessarabia which it acquired at the conclusion of the Crimean war, and to receive in exchange the Dobrudja. Early in the war the principality proclaimed its independence of Turkey, and its independence was recognized in the Treaty of Berlin, July 1878. As already stated it became a kingdom in 1881, Prince Charles becoming king as Charles I. His wife is well known as a writer under the pseudonym Carmen Sylva. His nephew and heir, Prince Ferdinand, was married in 1893 to Princess Marie, daughter of the late duke of Saxe-Coburg-Gotha.

Consult Laveleye, 'The Balkan Peninsula' (1887); Samuelson, 'Rumania, Past and Present' (1882); Walker, 'Untrodden Paths in Rumania' (1888).

Rumanian Language and Literature. The racial language, Rumanian or Wallachian, is of the Romance type (see ROMANCE LANGUAGES) derived from the Latin, but with many Slavonic, and some Greek, Turkish, and Albanian words. The number of Latin roots is variously estimated at more or less than half of the total, the next greatest element being Slavonic, according to some authorities almost equaling the Latin. The majority of the population speak what is practically the same language—the Daco-Rumanian—throughout the kingdom, in Transylvania, in the Banat, and other parts of Hungary, Bukowina, and Bessarabia. The Macedo-Rumanian, spoken south of the Danube and among the Balkans and Pindus, is largely modified by Greek; and the Istro-Rumanian, spoken in Istria and Croatia, has been much Slavonized.

The first Rumanian book, a psalter, was printed in 1577, but Rumanian literature practically dates from the chronicles of the 17th century, which are the earliest specimens of its national literature. Greek was long the language

RUMELIA — RUMINANTS

of the educated and aristocratic classes, but has been supplanted by French. In matters of general culture, little progress was made until the 19th century, when a popular Rumanian literature arose, the most interesting portion being the songs. Of these Basile Alecsandri (1821-90), one of the most notable of native poets and a patriotic and influential journalist, made a valuable collection (1866). Other distinguished names are Konstantin Negruzzi (1806-68), author of verses, plays, and historical studies, in prose and verse; Jakob Negruzzi (1843-), son of the former, author of poems, sketches, and tales widely read; Grigoie Alecsandrescu (1812-86), poet and political leader; Dimitrie Bolintineanu (1826-72), poet and novelist; and Michael Eminescu (1849-89), the great lyric poet of Rumania. German translations have been made by Kotzebue, Schott, Kremnitz, Rudow, and others, including 'Carmen Sylva' (q.v.), Queen of Rumania, herself an accomplished poet, novelist, and dramatist. Dora D'Istria (q.v.) pen-name of Elena Ghica (1828-88), wife of a Russian prince, is the author of Rumanian travel-sketches, and of historical and literary studies of great value, mostly written in French. Among authorities on the language are Hasden, Gaster, Titkin, and Franz von Miklosich, the latter the founder of Slavic philology, and author of 'Comparative Grammar of the Slavic languages,' and 'Etymological Dictionary of the Slavic languages.' There are histories of Rumanian literature by Cipariu, Densusianu, Gaster, Popfiu, and Philippide. The great dictionaries are those of Codrescu (1875), Lawrianu and Massimu, 'Dictionariulu Limbei Romane' (1876-9); Hasden, 'Etymologicum Magnum Romaniz' (1885-92); and there are standard chrestomathies by Pompiliu, and Gaster (1891). Consult Warner, 'Library of the World's Best Literature' (1899).

Rumelia, roo-mē'li-a, **Eastern**, Turkey in Europe, a province established, with administrative autonomy, by the treaty of Berlin, 1878, but now united with Bulgaria, and known also as southern Bulgaria. It is bounded on the north by the Balkan Mountains, on the east by the Black Sea, on the south by a line beginning at Cape Seityn about lat. 42° 20' N., and proceeding west-southwest to the Rhodope Mountains, and on the west by the watershed between the Maritza and the Karasu. Originally it was arranged that the province was to be under the direct political and military authority of the sultan, but it was to be administered by a Christian governor-general appointed for five years by the Porte, subject to the approval of the European powers. This arrangement took effect and continued for a few years, but in 1885 the government was overturned by a popular movement and a union with Bulgaria carried out, in which the Porte has acquiesced. The capital is Philippopolis. The area is 13,700 square miles. Pop. about 1,200,000. See BULGARIA.

Rum'ford, Count. See THOMPSON, BENJAMIN.

Ruminants, herbivorous split-hoofed animals, characterized especially by chewing the cud; they include the camels and llamas, giraffes, deer, pronghorns, antelopes, sheep, goats, and ox-tribe, and hence nearly all of the mammals most economically important to man. All of

these, except the camels and giraffes, are represented on the continent of North America, and two—the pronghorns and musk ox—are peculiar to it. In most no incisor or canine teeth exist in the upper jaw, the place of these teeth being supplied by a hardened or callous pad of gum, against which the lower incisors bite. Six incisors exist in the lower jaw. Canines are always present in the lower jaw, and are usually inclined forward and toward the incisors, which they nearly resemble in form. The general number of lower canine teeth is two. The molar and premolar teeth number six on each side of each jaw, and are selenodont, that is, possess flattened crowns topped by two double folds of enamel of an irregular crescentic shape. The stomach is divided into four compartments. (See DIGESTION.) In the process of feeding the herbage is rapidly cropped off by the lower incisors pressing against the hardened gum of the upper jaw. The food mixed with saliva is swallowed into the paunch, where it is simply moistened and then passes into the reticulum or second compartment. The aperture of the gullet now closes, and the mass of food contained within the gullet is propelled upward into the mouth by a muscular action similar to vomiting. Mastication of the food is now effected by a kind of rotatory motion, the lower jaw thus giving a first stroke, for example, from left to right, and the rotary motion continuing persistently afterward from right to left, or in the opposite direction to the first movement of the jaws. This is "chewing the cud." In the camels the motion of the jaws is said to be simply one from side to side. After being thus thoroughly masticated and remixed with saliva, the food is again swallowed, and passes at once on into the third stomach, and is assimilated.

Two distinct divisions of the ruminants may be recognized, according to nature of the horns, known respectively as the "solid-horned" and the "hollow-horned."

The first section includes the giraffe (although no external antlers arise), the deer and pronghorns; and the other the antelopes and the sheep, goat, and ox tribes. The antlers of deer consist of nearly homogeneous bony tissue, lighter and more porous in structure than ordinary bone; are generally much branched or forked, and are shed and renewed every year. (See ANTLERS; DEER.)

The horns of the hollow-horned ruminants are entirely different from the antlers of deer, in structure as well as in manner of growth. They are usually common to both sexes, as in our domestic cattle, are simple and not branched, and grow continuously throughout the life of the animal, though very slowly after it has reached maturity, and are never shed. They consist of a bony core—an elongated process from the frontal bone—covered with a sheath of horn. (See HORN.)

Technically speaking, the ruminant game animals of North America consist of three distinct families, two of which are represented by several genera, and some of the genera by numerous species. These families are: the pronghorns (*Antilocapridæ*); the deer (*Cervidæ*); and the sheep, goat, and ox tribes (*Bovidæ*). They are all "game animals," and some of them are rapidly approaching extermination. The pronghorns, though usually called the American

RUMP PARLIAMENT—RUNCIMAN,

antelope, is not a true antelope, but is of a distinct family type, found only in North America, and peculiar in the fact that its horns are branched and are shed annually. (See PRONGHORN.) The deer tribe consists in America of five genera, namely, the wapiti (*Cervus*); the small deer of the United States and Mexico (*Dama*, or *Odocoileus*); a Central American brocket (*Mazama*); the moose (*Alces*), and the caribou (*Rangifer*). These are separately described under their names. Altogether between 25 and 30 species of deer exist in North America, including Mexico. Of the ox and sheep tribes or horned ruminants, the most prominent native member is the almost extinct bison (q.v.). The mountain sheep (see BIGHORN) number five species, and the Rocky Mountain goats (q.v.) number two species; but of most of these species so few examples are known, and their range is so limited that it may well be doubted whether they will ultimately be regarded as distinct. The goats and sheep are mountain dwellers, their favorite haunts are the more inaccessible parts of the higher ranges, and they are exceedingly watchful and sagacious. They have been exterminated in the more accessible parts of their ranges, and survive in comparatively small numbers and greatly restricted areas. The musk-oxen, or musk-sheep, are a very distinct type, entitled to a distinctive name free from the implication of any such alliance; but the term musk-ox (q.v.) is not likely soon to be displaced. There are two species, the barren-ground and the Greenland.

The ancestors of the higher ruminants are mainly of Old World origin, and are comparatively scarce and late in appearance in the fossil beds of our own continent. The oldest forms definitely known were those of the family *Anthracotheriidae*, pig-like animals, with teeth approaching the selenodont shape, and a complete dentition; all the bones of the five-toed feet were free. The type-genus *Anthracotherium* (q.v.) begins in the Oligocene and continues down to the Pliocene, and is known from all parts of the world. Another early group was more sheep-like in its characteristics, and forms the family *Canotheriidae*, represented by *Canotherium*, which flourished in the Eocene and Miocene eras. They were small-sized, more delicate than modern sheep, the dentition was complete, and four toes reached the ground. Another large group was the family *Oreodontidae*, which was limited to North America, and whose remains have been found plentifully and usually in excellent condition in the Tertiary rocks of the eastern Rocky Mountain region. The oreodonts were ancestors of deer and antelopes, and some were horned, while all had five functional toes in front and four behind. Prominent genera are *Oreodon*, of the size of a small pig; *Mesoreodon*, larger and stouter; *Casoryx*, *Agriocherus*, and most primitive of all *Protoreodon*. Another primitive family wholly European was *Anoplotheriidae*, represented by the long-known *Anoplotherium* (q.v.).

Rump Parliament, in English history, a name by which the remains of the Long Parliament was known after the expulsion of the majority of its members by the army of Cromwell, 6 Dec. 1648. It having been decided by a majority of the House of Commons that the con-

cessions made by Charles I. in the Treaty of Newport were a ground of settlement, Oliver Cromwell, who wished for the condemnation of the king, despatched two regiments under the command of Colonel Pride to coerce the House. In discharge of the resolution of the army that "none might be permitted to pass into the House but such as continued faithful to the public interests" Colonel Pride, whose regiment was stationed so as to block up all the entrances to the House of Commons, furnished himself with a list of the names of the members against whom the sentence of exclusion was passed, and as each approached prohibited him from entering. Forty-one members were placed under temporary restraint, and 160 ordered to their homes. Only 60 were admitted, all violent Independents, and these constituted the rump after the clearance wrought by Pride's purge, as it is called. This assembly, in conjunction with the army, brought about the arraignment, trial, and condemnation of Charles I. It was forcibly dissolved by Cromwell, 20 April 1653, for presuming to make a stand against certain demands of the army. Twice after this it was reinstated, but both times only for a brief period, and finally, on 16 March 1660, it solemnly decreed its own dissolution.

Rumsey, rŭm'sŭ, James, American inventor: b. Bohemia Manor, Cecil County, Maryland, in 1743; d. London, England, 23 Dec. 1792. He was a mechanical engineer, and while engaged as the superintendent of a mill in Shepherdstown, Va., conceived plans for the application of steam to marine propulsion. In 1786 he exhibited a boat upon the Potomac which was propelled by means of a steam pump which forced a stream of water from the stern. The Rumsey Society, in which Benjamin Franklin was greatly interested, was established in Philadelphia in 1788, and later an organization of the same name in England, to further his invention, but he died while his experiments were incomplete. He wrote 'A Short Treatise on the Application of Steam' (1788).

Rumsey, William, American jurist: b. Bath, Steuben County, N. Y., 18 Oct. 1841; d. New York 16 Jan. 1903. He was educated at Williams College, volunteered in the Union army in April 1861, and was granted his diploma from the college in June. He served through the war, attaining rank of captain of volunteers in 1863, major in 1864, and brevet lieutenant-colonel in 1865, in which year he was mustered out of service. He was secretary of the United States legation in Japan in 1865-6, and in 1880-1901 served as judge in the seventh judicial district of the supreme court. He then resigned and engaged in law practice until his death.

Runciman, rŭn'sŭ-mān, Alexander, Scottish painter: b. Edinburgh 1736; d. there 21 Oct. 1785. He was placed at 14 with some house-painters, who used to adorn the mantel-pieces of the houses which they painted with landscapes, of which many a specimen is still preserved in the houses of the Old Town of Edinburgh. He devoted himself entirely to this art; and acquired considerable local fame for his landscapes. In 1766 he visited Italy, where he met Fuseli, whose enthusiastic character matched aptly with his own. He spent five years in Rome, assiduously studying and copying the Italian masters; and in

RUNEBERG — RUNNYMEDE

1771 returned with powers increased and taste improved. Just at that time he obtained the mastership of the Trustees' Academy; and thus secured in the means of subsistence he applied his leisure to historical painting. Among his best-known productions may be mentioned: 'Macbeth and Banquo,' in a landscape; a 'Friar,' in a landscape; 'Job in Distress'; 'Samson Strangling the Lion'; 'Figure of Hope'; 'Saint Margaret Landing in Scotland'; 'Christ and the Woman of Samaria'; 'Agrippina Landing with the Ashes of Germanicus'; and the paintings in Ossian's Hall at Penicuik. The work last mentioned was the *chef-d'œuvre* of Runciman. He was remarkable for candor and simplicity of manners, and possessed a talent for conversation. Among his associates were Robertson, Hume, Lord Kames, and Lord Monboddo.

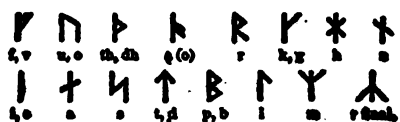
Runeberg, Johann Ludvig, yō'hän lood'vīg roo'nē-bērg, Swedish poet: b. Jacobstad, Finland, 5 Feb. 1804; d. Borgå 6 May 1877. He was educated at Wasa and at the University of Åbo. His first volume (1830) contained a number of lyrics and a long poem, 'Nights of Jealousy.' In 1832 appeared an epic written in hexameters 'Elgskytterne' (The Elk Hunters); in 1833 a second volume of lyrics, and in 1836 the idyl 'Itanna.' In 1837 he taught Latin literature at the university, became lector at the gymnasium of Borgå, where he remained until his death, being advanced to professor in 1844 and rector in 1847. His other works were the idyl 'Julqvällen' (Christmas Eve) and the epic 'Na donchda' (1841); Lyrics (1843); a romantic cycle, 'Kung Fjalar' (King Fjalar, 1844); narrative poems, 'Fänriek Ståls Sägner' (Ensign Stål's Stories, 1848-60); a rhymed comedy 'Kan ej' (Can't, 1862); 'Kungarne på Salamis' (The King at Salamis, 1863). His collected works were published in 1876 and posthumous works in 1878-9.

Runes, the characters used in writing by the Teutonic tribes of northwestern Europe in early times. Three classes of runes are recognized, Anglo-Saxon, German, and Scandinavian, but the differences of form which distinguish them are no wider than the differences between the alphabets employed in very ancient times by various Greek peoples—between the Old Athenian alphabet, for example, and the Old Corinthian, or between the earliest Phœnician and the earliest Hebrew. The name Rune is significant of the use to which this manner of writing was first applied. In Anglo-Saxon *rūn* means secret, and *runa* magician; and the knowledge of runes was confined to a small class—priests or sorcerers. For this reason, upon the introduction of the Christian religion the use of the runes was condemned as connected with heathenish superstitions. A poet of the 6th century, Venantius Fortunatus, tells of runes being written on tablets or slabs of ash (*fraxineis tabellis*), but there are extant numerous runes inscribed on memorial stones, rings, coins, etc., which have been found in Denmark, Norway, Sweden, Germany, and Iceland, and in Britain within the limits of the ancient kingdoms of Northumbria, Mercia, and East Anglia. The system of characters called runes gets the name Futhorc from the first six letters,

just as the Greek system is called Alphabet from the names of the first two letters, alpha and beta, A and B, or as we call our alphabet the A B C. The following examples show the agreements and differences between British and Norse runes:



Anglo-Saxon Runes.



Norse Runes.

What is the origin of this mode of writing? Is it derived from the Greek alphabet or from the Phœnician direct? Not improbably the Phœnician manner of writing was introduced into the Baltic countries by the enterprising Phœnician traders as early as the 6th century B.C.: but though the runes are in many instances identical with characters of the Phœnician alphabet they do not represent in Futhorc the same sound values as in the alphabet of the Phœnicians: on the supposition of their derivation from that alphabet, therefore, it would be only the idea of representing voice-sounds by arbitrary written characters that would have come from the Phœnicians, not the denotations of particular sounds. Yet, though original derivation from Phœnician sources be granted, in later times Greek characters were added to complete the system.

Runjeet Singh, rūn-jēt' sīngh. See RANJIT SINGH.

Runkle, rūn'kl, John Daniel, American mathematician: b. Root, N. Y., 11 Oct. 1822; d. Southwest Harbor, Maine, 8 July 1902. He was graduated from the Lawrence Scientific School at Harvard in 1851, and having been appointed to the staff of the 'American Ephemeris and Nautical Almanac' in 1849, continued with it until 1884. He was one of the promoters of the Massachusetts Institute of Technology and held the chair of mathematics there from the time of its foundation until his retirement shortly before his death with the exception of 1870-8 when he was president. He established the 'Mathematical Monthly' in 1859 and edited it until 1861, and published: 'New Tables for Determining the Values of the Coefficients in the Perturbative Function of Planetary Motion' (1856); 'Elements of Plane and Solid Geometry' (1888); etc.

Runic Characters. See RUNES.

Runnymede, rūn'i-mēd, England, five miles east of Windsor, in Surrey, lying along the right bank of the Thames, is the celebrated meadow where the conference was held, 15 June

RUNYON — RURAL HIGHWAYS

1215, between John and the English barons, in which the former was compelled to sign Magna Charta and the Charta de Foresta. (See JOHN.) Runnymede is now divided into several enclosures.

Run'yon, Theodore, American diplomat: b. Somerville, N. J., 25 Oct. 1822; d. Berlin, Germany, 27 Jan. 1896. He was graduated from Yale in 1842, admitted to the bar in 1846, and established a law practice at Newark, N. J. He became city attorney of Newark in 1853, city counsellor in 1856, and at the outbreak of the Civil War went to the front as brigadier-general in command of the 1st brigade of New Jersey Volunteers. He arrived at Washington on 6 May, when the threatened invasion by the Confederates had thrown the city into great alarm, and promptly took efficient measures for its defense. After the defeat of the Union army at the first battle of Bull Run when the city was in danger of invasion, he closed all approaches, stationed cannon to avert the expected attack, and thereby saved the National capital, a service for which he received the personal thanks of President Lincoln and his cabinet. He was honorably mustered out of service in July 1861 and resumed his law practice. In 1863 he was elected mayor of Newark, served as chancellor of New Jersey in 1873-87, and in 1893 was appointed minister to Germany. He was raised to the rank of ambassador in that year and remained in office until his death.

Rupee, roo-pé', in India, the name given a small silver coin. The value of this coin is nominally 50 cents, but owing to the depreciation of silver it has of late years varied between 30 and 40 cents. A rupee equals 16 annas; $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$ rupee are also coined in silver. A *lac of rupees* is 100,000, and a *crore* 10,000,000 rupees.

Ru'pert, or Robert, of Bavaria, PRINCE: b. Prague 18 Dec. 1619; d. London 29 Nov. 1682. He was the son of Frederick V., elector palatine and titular king of Bohemia, by the Princess Elizabeth of England, daughter of James I., was educated at Leyden and early engaged in military service in the Thirty Years' war. During the civil war in England he had the command of a corps of cavalry, at the head of which he distinguished himself at the battle of Edgehill in 1642, at Chalgrove Field in 1643, and also at Marston Moor and at Naseby; but his impetuosity and imprudence contributed to the disastrous result of these latter engagements. In 1648 he was made commander of that part of the fleet which still adhered to Charles. Prince Rupert for some time carried on a predatory warfare against the English; but in an engagement with Blake, off the Spanish coast, he was worsted, and his whole squadron destroyed, with the exception of four or five ships, with which he escaped to the West Indies, where he supported himself by capturing English and Spanish merchantmen. Later he joined Charles II. at the court of Versailles, where his time was chiefly devoted to scientific studies till the Restoration, when he returned to England. In 1664 he was appointed with Monk, to the command of a fleet against the Dutch, and in the next war with Holland, in 1673 was made admiral of the fleet. Many useful inventions resulted from his studies,

among which are the invention of prince's metal, and although the discovery of the method of engraving in mezzotinto is not due to him, as has been erroneously supposed, he introduced the art into England. He also introduced the curious glass drops that have been named after him, Prince Rupert's drops. He was likewise one of the founders and the first governor of the Hudson's Bay Company, incorporated in 1670, and a founder of the Royal Society.

Rupert's Land, the former name of an extensive territory in Canada, conferred by Charles I. on Prince Rupert, transferred to the Hudson's Bay Company in 1670, and since 1870 included with the other parts of the Hudson Bay Territories in the Northwest Territories. The title is still retained to distinguish an Episcopal diocese; the see of the bishop of Rupert's Land is at Winnipeg. See NORTHWEST TERRITORIES.

Ru'pia, a skin disease, characterized by an eruption of small flattened and distinct bullæ surrounded by inflamed areolæ, containing a serous, purulent, sanious, or dark bloody fluid, and followed by thick, dark-colored scabs over unhealthy ulcers. Three varieties of this disease are described, *Rupia simplex*, *Rupia prominens*, and *Rupia escharotica*. *Rupia simplex* commonly appears on the legs, sometimes on the loins or thighs, and seldom on other parts. The bullæ are not preceded by any inflammatory symptoms, vary from $\frac{1}{2}$ inch to 1 inch in diameter, and contain at first a transparent serous fluid, which soon becomes turbid and purulent, and dries into scabs. The scabs are easily removed, displaying an ulcerated surface underneath, and several series of these scabs may follow before healing sets in. In *Rupia prominens* the bullæ are larger, the scabs thicker, and the ulceration deeper. The scab adheres firmly, and generally requires emollient applications to facilitate its removal. *Rupia escharotica* occurs chiefly in cachectic children and infants. It is commonly confined to the lower extremities, and begins by one or two red and livid spots, over which the cuticle is soon raised by the effusion underneath it of a serous fluid. The bullæ thus formed increase; the serum they contain becomes turbid, and of a blackish hue. A bloody and offensive sanies marks the surface of the sore, the edges of which are livid, but not very painful. *Rupia* is chronic, not dangerous, not contagious, but often very obstinate. It generally attacks persons debilitated by age, intemperance, bad living, or previous diseases, especially smallpox, scarlet-fever, and syphilis. The general treatment consists mainly in the administration of tonic decoctions, more especially those of cinchona, cascarilla, gentian, etc., with alkalies, a generous and nutritious diet, and warm salt water and alkaline baths. The local treatment consists chiefly of puncturing the bullæ early, and allowing the morbid secretion to escape; of poulticing in order to remove the scabs, and of applying lotions containing nitrate of silver or nitric acid, or any other slightly stimulating application.

Rupture, hernia (q.v.), especially abdominal hernia, to which the term rupture is most frequently applied in popular usage.

Rural Highways. See ROADS, IMPROVEMENT OF.

RURIK — RUSH

Rurik, roo'rik, founder of the Russian monarchy: d. 879. Most writers consider him to have been a Varangian, of Scandinavian origin, though Kostomorof has endeavored to prove that he was a Lithuanian. It is recorded that he came to Russia about 862, accompanied by his brothers Sinaf and Truvor, in compliance with the request of Gostomisl, a leading personage of Novgorod. One of the brothers established himself at Belozersk, the other at Izborsk, while Rurik began by fortifying himself in the ancient town of Ladoga, at the present day a miserable village on the Volkhof. The Novgorodians soon repenting, rose in rebellion against Rurik, and at their head was one of their fellow citizens named Vadim, whose valor is celebrated in the ancient chronicles, and in Russian song. Rurik succeeded in establishing a dictatorship in Novgorod in 865, and is said to have killed Vadim with his own hand. His possessions were soon afterward greatly enlarged by the death of his brothers, whose principalities, since they died without issue, Rurik united to Novgorod. In order to secure himself and his descendants in their newly acquired territory, he invited various colonies of Varangians, on whose devotion he could count, to settle in the country. Rurik died after a reign of 17 years. The family of Rurik reigned in Russia till the death in 1598 of Feodor, son of Ivan the Terrible, when it was succeeded by the closely allied house of Romanoff.

Rus'by, Henry Hurd, American botanist and educator: b. Franklin, N. J., 26 April 1855. He was educated at the University of New York, was engaged in botanical explorations and investigations under the Smithsonian Institution in 1880-96, has been professor of botany, physiology and materia medica in the New York College of Pharmacy since 1888, and professor of materia medica at Bellevue Hospital Medical College since 1897. He is a member of many scientific societies, was curator of the New York Botanical Gardens and in 1900-1 was a member of the committee which revised the botanical department of 'United States Pharmacopœia.' His publications include: 'Essentials of Pharmacognosy' (1895); 'History of the New York College of Pharmacy' (1895); 'Morphology and History of Plants' (1899); 'Five Pamphlets on the Flora of Bolivia' (1893-1901); etc.

Rush, Benjamin, American physician: b. Byberry, near Philadelphia, Pa., 24 Dec. 1745; d. Philadelphia 19 April 1813. He was graduated from Princeton in 1760, from the University of Edinburgh in 1768, and became professor of chemistry at the College of Philadelphia in 1769. He was active in the pre-Revolutionary movements, and as member of the provincial conference of 1776 moved the resolution declaring the expediency of a declaration of independence, of which he was a signer in the following month. He was surgeon to the Pennsylvania navy in 1775-6 and in 1777 was appointed surgeon-general and later physician-general of the hospitals of the middle section. In 1778 he resigned and resumed his practice and his professorship at Philadelphia. He was a member of the convention which formed the constitution of 1780, established the first dis-

pensary in the United States in 1785, and in 1787 was a member of the convention which ratified the Federal Constitution. He became professor of theory and practice of medicine in 1789 and after the Medical College was merged in the University of Pennsylvania was appointed professor of the institutes and practice of medicine and of clinical practice. In the yellow fever epidemic of 1793 Rush instituted a new method of treatment for the disease which he used with great success, visiting from 100 to 120 patients daily. He was one of the founders of Dickinson College, an advocate of the abolition of slavery, was connected with various religious and scientific societies, and was treasurer of the United States Mint from 1799 until his death. He wrote: 'Medical Inquiries and Observations' (5 vols., 1780-98); 'Essays, Literary, Moral, and Philosophical' (1798); etc.

Rush, Richard, American diplomat: b. Philadelphia 29 Aug. 1780; d. there 3 July 1859. He was graduated from Princeton in 1797, was admitted to the bar in 1800 and engaged in practice at Philadelphia. In 1811 he was appointed attorney-general of Pennsylvania and in 1814-17 was attorney-general of the United States. He was temporary secretary of state under President Monroe in 1817 and was then appointed minister to England, a post he occupied until 1825 when he was recalled to become secretary of the treasury under President Adams. He was a candidate for the vice-presidency on the ticket with Adams in 1828 and in 1836 was appointed by President Jackson commissioner to obtain the legacy for the founding of the Smithsonian Institution which was then pending in the English chancery court, returning in 1838 with the entire amount. He was appointed minister to France in 1847 and remained such until 1851 when he was recalled at his own request and spent the remainder of his life in retirement. He published: 'Codification of the Laws of the United States' (5 vols., 1815); 'Narrative of a Residence at the Court of London from 1817 till 1825' (1833); 'Washington in Domestic Life' (1857); 'Occasional Productions, Political, Diplomatic, and Miscellaneous, including a Glance at the Court and Government of Louis Philippe, and the French Revolution of 1848' (published by his sons, 1860).

Rush, William, American sculptor: b. Philadelphia 4 July 1756; d. there 17 Jan. 1833. He was apprenticed to a carver and soon became known as a maker of figure-heads which won admiration in many ports in the world. He never worked in marble, confining himself to wood and clay, but gained a high reputation for his statues, busts, and ideal figures executed in these materials. He served in the American Revolution and was a member of the city councils of Philadelphia for more than a quarter of a century. Among the most admired of his ship carvings were: 'Genius of the United States'; 'Nature'; 'Indian Trader'; 'William Penn'; 'River God.' He also executed: 'Exhortation'; 'Praise'; busts of Linnæus, William Barton, and Lafayette; statues of 'Winter,' 'Washington' (1814); etc.

Rush. Many plants growing in moist land having cylindrical stems are called rushes, al-

RUSH MEDICAL COLLEGE—RUSHVILLE

though generally with a qualifying adjective; as the bulrush (*Typha*), flowering rush (*Buto-mus*), or scouring rush (*Equisetum*), and some sedges (*Carex*). The true rushes, however, are members of the grass-like family *Juncaceae*, containing about 200 species in the several genera, and distributed throughout the temperate zones. Some are destitute of leaves but have barren flower stems resembling leaves; some have leafy stems, the leaves rounded or somewhat compressed, and usually jointed internally; the foliage of others is very narrow, springing from the root. The round stems of the leafless species, sometimes bearing flowers, are popularly called rushes. The presence of this family in a pasture denotes bad drainage, and they are troublesome to farmers, since cattle will touch them only as a last resort. The common bog or soft rush (*Juncus effusus*) is found in wet places throughout the temperate world. It is a typical species, with glabrous tufts attaining perhaps four feet, springing from a stout rootstock, and bearing an inflorescence composed of many small greenish grass-like flowers. This species is cultivated in Japan for making mats, and with others is employed for the bottoms of chairs, baskets, coarse ropes for binding, etc. The stems of *J. conglomeratus* were formerly gathered by English farmers, and stripped of their green rind, leaving exposed a large pith with one even lengthwise rib of rind left to support it. This porous pith was then bleached and dried, and dipped in scalding grease, thus becoming the wick of a rude candle, or "rush-light," which gave a good, clear light, and, if two feet long, would burn nearly an hour. These dried rush-piths were also used in place of cotton for wicks in open lamps.

Rushes, with a few sweet herbs, were scattered before processions, and were strewn on stages in Shakespeare's time, and on the floors of houses before the advent of carpets. The strewing of rushes in the churches grew into a religious festival conducted with much pomp. These rushes on the floor generally became so filthy from overlong use that to order fresh rushes was a sincere mark of honor to a guest.

Scouring rushes are the hollow, jointed stems of the horsetail, *Equisetum hiemale*, the epidermis of which is impregnated with silica, and was formerly used for scouring metals. See DUTCH RUSH.

Bulrushes (*Typha*), or cat-tails, were somewhat employed in the place of true rushes, for mats and chair bottoms, and are also placed between barrel-staves.

Rush Medical College, located at Chicago, affiliated with the University of Chicago. It is one of the oldest educational institutions in the Northwest, having received its charter in 1837. The first lectures were delivered in 1843, and the first building erected in 1844; a larger building was erected on the same site in 1867; this was burned in the Chicago fire of 1871; and the present clinical building was erected in 1875. In 1887 the college became the Medical Department of Lake Forest University, retaining its autonomy; this relation was dissolved in April 1898, and in the same month the college was affiliated with the University of Chicago (q.v.). The government of the college is vested

in the "perpetual board of trustees" incorporated in 1837, of which the governor of the State, the lieutenant-governor, and the speaker of the house of representatives are members *ex officio*. The board has control of the financial affairs of the college and appoints the faculty; and delegates to the faculty the control of the educational work subject to the rules of the university and the approval of the trustees; by the terms of affiliation the board of trustees is composed of members not belonging to the teaching force of the college. In 1899-1900 the University offered courses corresponding to the work of the Freshman year of the Medical College, and since 1901 offers instruction in all of the courses of the first two years of the medical curriculum, in anatomy, neurology, embryology, physiology, physiological chemistry, chemistry, chemistry of medical drugs, toxicology, pathology, bacteriology and pharmacology. All the work of the first two years is offered at the university only, and the work at the college is clinical, that is, the work of the last two years of the medical course. Students who take the first-year courses matriculate and register both as students of Rush Medical College and as students of the university. Many of the courses of the Freshman and Sophomore years are required; the courses of the Junior and Senior years are all elective, a certain amount of work in each department being required for the degree of M.D. The university provides three fellowships to graduates of the college, and provides for granting the degree of B.S. to students who comply with the university requirements for that degree. The buildings of the college, distinct from those of the university, are the clinical building, Senn Hall and the laboratory building; the Presbyterian Hospital, adjoining the college, and the Cook County Hospital, opposite the college, afford material for the clinics. The library in 1910 contained over 21,000 volumes; the students in 1909-10 numbered 328, of whom 79 were specials and post-graduates. The college is open to women as well as men.

Rush, Scouring. See *Equisetales*, under FERNS AND FERN ALLIES; DUTCH RUSH.

Rushforth, William Henry, American inventor: b. Leeds, England, 11 July 1844; d. Rutherford, N. J., 21 Aug. 1892. He entered a railroad repair shop at 12 and at 19 had become a railroad engineer. He was chief engineer in charge of 13 stationary engines in 1874 and in 1878 came to the United States, where he became engineer in a silk factory at Camden, N. J. He was the author of numerous useful inventions, among them a fire-escape ladder, a series of automatic safety signals and a feed-water heater for utilizing the heat wasted in the smoke boxes of locomotives, the latter receiving a silver medal and a diploma at the Paris Exposition of 1887.

Rushville, Ill., city, county-seat of Schuyler County; on the Chicago, B. & Q. railroad; about 53 miles northwest of Springfield, and 48 miles east-northeast of Quincy. It was settled 20 Feb. 1826 by Benjamin Chadsey, Levi Green, and Thomas Bair, members of a commission that selected a town site. It was incorporated as a village 10 May

RUSHVILLE—RUSKIN

1831, and chartered as a city in April 1898. It is in an agricultural and coal mining region; the chief manufactures are a flour mill, machine shop, wagon works, harness shops, bottling works, and file factory. It has considerable trade in farm products. The principal public buildings are the county court-house and the jail. There are six churches, three public graded schools, and the Rushville Normal and Business College. The two banks have a combined capital of \$150,000, with \$700,000 deposits. The government is vested in a mayor and a council of six members, who hold office for a term of two years. Pop. (1890) 2,031; (1900) 2,292; (1910) 2,370.

EDWIN DIGSON,
Editor 'Rushville Times.'

Rushville, Ind., city, county-seat of Rush County; on Flat Rock Creek; and on the Cleveland, C. & St. L., the Cincinnati, H. & D., the Pittsburg, C. & St. L., and the Fort Wayne, C. & L. R.R.'s; about 40 miles east-southeast of Indianapolis, and 85 miles northwest of Cincinnati. It was settled in 1822, incorporated the same year, and chartered as a city in 1882. It is in a fertile agricultural region, and has considerable manufacturing interests. The chief manufactures are flour, furniture, machinery, agricultural implements, lumber, bent wood, drain pipe, clothing, clay-working machinery, and washing machines. There are nine churches, a high school, public and parish schools, two private schools, and a public library. The four banks have a combined capital of \$275,000. The government is vested in a mayor, a council of six members, elected every two years. The city owns and operates the electric light plant and the waterworks. Pop. (1910) 4,607.

Rusk, Jeremiah McLain, American agriculturist: b. Morgan County, Ohio, 17 June 1830; d. Viroqua, Wis., 21 Nov. 1893. He removed to Wisconsin in 1853, engaged in farming, became sheriff, and in 1861 was elected to the legislature. In 1862 he entered the Union army, was commissioned major, and promoted lieutenant-colonel in 1863. He commanded a regiment in Sherman's Meridian campaign and for services in the Atlanta campaign was brevetted colonel and brigadier-general in 1865. He was mustered out of service in that year and in 1866-70 served as bank-comptroller of Wisconsin. Elected to Congress in 1871 he remained there until 1877 and in 1882-9 was governor of Wisconsin. He was first secretary of the newly created Department of Agriculture under President Harrison in 1889-93.

Rusk, Thomas Jefferson, American politician: b. Camden, S. C., 8 Aug. 1802; d. Nacogdoches, Texas, 29 July 1856. He studied law, practised in Georgia, and in 1835 removed to Texas, where he took a prominent part in political affairs. He was a member of the convention which declared the independence of Texas in 1836, was its first secretary of war, and after the disablement of General Houston took command of the army at San Jacinto. He was chief justice of Texas and in 1845 president of the convention which concluded annexation with the United States. He sat in the United States Senate in 1846-56.

Rus'kin, John, English critic and author: b. London 8 Feb. 1819; d. Coniston, Lancashire, 20 Jan. 1900. He attended lectures at King's College, London, was trained in drawing, and in 1836 went to Oxford, where he became a gentleman-commoner at Christ Church. In 1839, after two failures, he won the Newdigate prize for a poem on 'Salsette and Elephantia.' His first published works were essays in Loudon's 'Magazine of Natural History' on geological and allied subjects (1834 and 1836), and in 1837-8 he wrote for Loudon's 'Architectural Magazine' on 'The Poetry of Architecture' (separately published, 1893). An attack upon some of Turner's pictures in 'Blackwood's Magazine' in 1836 led him to formulate the plan of his 'Modern Painters,' the 1st volume of which appeared in 1843 as by 'A Graduate of Oxford.' The 2d volume was published in 1846, the 3d and 4th in 1856, and the 5th in 1860 (complete edition, imperial 8vo, with all the original and three new plates, six vols., 1888; 8vo edition, with reduced plates, six vols., 1897). At first intended as a defense of Turner, the work from the first assumed a wider scope, and soon became a comprehensive treatise on the principles of art. He sought to show the immense superiority of the best modern landscape-painters, especially Turner, to all the ancients, and supported the spiritual against the sensuous theory of art with an eloquence and a width of knowledge which have indeed wrought, as Sydney Smith predicted, "a complete revolution in the world of taste." The descriptions of natural scenery in the book are justly regarded as priceless gems of word-painting, and the sense of the indissoluble association of art with all other branches of human activity, so characteristic of Ruskin, became increasingly marked as the work progressed. His name was not put on the title-page till 1851.

After the publication of the 1st volume of 'Modern Painters' he continued his studies and his travels, and during a visit to Venice he definitely decided upon literature as his main work. In 1848 he married Euphemia Chalmers Gray, the 19-year-old daughter of a Scottish lawyer, for whom he had written in 1841 his fairy tale, 'The King of the Golden River' (published 1851). His married life was not very fortunate, and in 1854 the marriage was annulled, and the lady married the artist Millais in 1855. 'The Seven Lamps of Architecture' (1849) sought to do for architecture what Ruskin had already done for painting. The title and arrangement of the book are characteristic of his whole artistic criticism. All work in architecture, and in all else, should be illumined by the lamps of sacrifice, truth, power, beauty, life, memory, and obedience. In 1851 he defended Millais and Holman Hunt, two of the pre-Raphaelite leaders, in letters to the *Times*, and in the same year followed up this advocacy by a work on Pre-Raphaelitism. 'The Stones of Venice' (1851-3), the fruit of much close study and arduous toil, is a worthy companion of 'Modern Painters,' and in it, as in the earlier work, we meet the moralist as artist. The chapter 'On the Nature of Gothic Architecture,' in which his economic teaching is distinctly foreshadowed, was reprinted by

William Morris at the Kelmseott Press in 1892. In 1854 Ruskin came to know D. G. Rossetti, to whom he was a considerate and generous patron; and he was closely associated with F. D. Maurice, Fumivall, and other Christian Socialists in the work of the Working Men's College, where he taught drawing regularly for some seven years. His career as a social reformer may be dated from 1857, when he published a series of lectures on 'The Political Economy of Art' (enlarged edition, entitled 'A Joy for Ever and its Price in the Market,' 1880). His chief works of this kind are: 'Unto this Last' (1862; popular edition, 1900), originally written for the 'Cornhill Magazine'; 'Munera Pulveris' (1872), partly reprinted from 'Fraser's Magazine'; 'Time and Tide by Weare and Tyne' (1867); and 'Fors Clavigera' (1871-84), consisting of letters to the working men and laborers of Great Britain. In these the tendency to exaggeration is clearly manifest, and for a time it stood in the way of the serious consideration of his views. He laid especial stress upon the economic value of healthy, happy, honorable, self-sacrificing life; he directed attention to the vital importance of the problem of distribution and the necessity of economic co-operation; the need for a genuine national system of education, old-age pensions, and a radical solution of the housing problem was eloquently set forth by him. In this work Ruskin always professed himself a follower of Carlyle, one of his warmest friends and admirers. Some of his books published after 1855 were collections of lectures. Such are: 'The Two Paths' (1859); 'Sesame and Lilies' (1865); 'The Crown of Wild Olive' (1866); 'Work, Traffic, War, and The Future of England' (last not in first edition); and 'The Ethics of the Dust' (1866). In 1867 he delivered the Rede lecture at Cambridge on 'The Relation of National Ethics to National Art,' and was awarded the honorary degree of LL.D. by that university, and in 1893 Oxford conferred upon him its D.C.L. degree. In 1871 he was elected lord rector of St. Andrews University.

The period from 1870 till his retirement from active work was full of new schemes of social usefulness, some of them more generous in conception than practicable in execution, but all bearing eloquent testimony to the absolute sincerity of his preaching of the gospel of social righteousness and service. In 1871 he founded the Guild of Saint George, and himself paid \$35,000, a tenth of his possessions at that time, into a trust for carrying on its work. The basic principles of the guild were "that food can only be got out of the ground and happiness out of honesty," and in connection with it he started agricultural settlements, some industrial enterprises, and the Saint George's (now Ruskin) Museum at Sheffield.

In 1871 he gave up his house at Denmark Hill and purchased his well-known residence at Brantwood, on the shore of Coniston Lake. In 1870 he was appointed first Slade professor of fine arts at Oxford, and held this post till 1879, when he resigned owing to illness, and again from 1883 till 1884, when he again resigned because the university endowed vivisection. His lectures at Oxford give the best connected

account of his maturer conceptions of art and form the material of the works: 'Lectures on Art' (1870); 'Aratra Pentelici: Six Lectures on the Elements of Sculpture' (1872); 'The Eagle's Nest: Ten Lectures on the Relation of Natural Science to Art' (1872); 'Ariadne Florentina: Six Lectures on Wood and Metal Engraving' (1873-6); 'Val d'Arno: Ten Lectures on the Tuscan Art Directly Antecedent to the Florentine Year of Victories' (1874); 'The Art of England' (1884); 'The Pleasures of England' (1884); and 'Lectures on Landscape Delivered in Lent Term,' 1871 (1897). He founded a drawing school at Oxford, and it was during his professorial period that he tried the famous and exceedingly characteristic road-digging experiment. In 1878 he experienced the first of several attacks of brain fever, and from this time his excessive work at an unnaturally high pressure caused his health to break down seriously; 1878 was also the year of Whistler's libel action against him, in which the jury awarded one farthing damages. The most notable work of his period of final retirement, broken only by short journeys in search of health, is 'Præterita: Outlines of Scenes and Thoughts Perhaps Worthy of Memory in my Past Life' (1885-9), the last volume containing 'Dilecta,' or selections from his correspondence. This fragment of autobiography bears little trace of mental decay, but is notable for brilliant description, vivid recollection, and excellent portraiture of men whom he had known. Of works not above mentioned the following are the most noteworthy: 'Poems' (1850, privately printed; two vols., 1891); 'Examples of the Architecture of Venice' (1851); 'Lectures on Architecture and Painting' (1853); 'Notes on Some of the Principal Pictures Exhibited at the Royal Academy' (1855-9 and 1875); 'The Harbors of England' (1856), with engravings from drawings by Turner; 'Catalogue of the Drawings and Sketches of Turner at present Exhibited in the National Gallery' (1881); 'The Elements of Drawing' (1857), lectures delivered at the Working Men's College; 'Inaugural Address at the Cambridge School of Art' (1858); 'The Oxford Museum' (1859), with H. W. Acland; 'The Elements of Perspective' (1859), lectures delivered at the Working Men's College; 'The Queen of the Air' (1869), lectures on the Greek myths of cloud and storm; 'Mornings in Florence' (1875-7; collected, 1889); 'Proserpina: Studies of Wayside Flowers' (1875-86); 'Deucalion: Collected Studies of the Lapse of Waves and Life of Stones' (1875-83); 'St. Mark's Rest: the History of Venice' (1877-84; collected, 1884); 'The Laws of Fésolo: A Familiar Treatise on the Elementary Principles and Practice of Drawing and Painting' (1877-8); 'Notes on the Drawings by Turner Exhibited at the Fine Art Society's Galleries' (1878; new edition, 1900); 'Arrows of the Chace' (1880), a collection of newspaper letters; 'The Bible of Amiens' (1880-5); 'On the Old Road' (1885), a collection of miscellaneous writings. In 1871 a collective edition of his works was begun, but extended to only 11 volumes. E. T. Cook is supervising a new complete edition of his works begun in 1903 and to be finished in 30 volumes.

RUSKIN UNIVERSITY — RUSS

There is a complete bibliography by T. J. Wise and J. P. Smart (1893). Ruskin prepared the plates, or at least the drawings, for many of his own works, and also painted some landscapes, chiefly in water color. A loan exhibition of his drawings was held in the Royal Water Color Society's rooms in 1901.

To what has already been said of the work and message of Ruskin little need be added. He was essentially a prophet, on fire with the enthusiasm of humanity, almost fierce in his opposition to every kind of insincerity and injustice. His early religious views were narrow, but in middle life he advanced to a broadly liberal position of no distinctively Christian character, though in later years he added to his religious liberalism a more definitely Christian element. What he said of 'Modern Painters' may be applied to all his work: "It declares the perfectness and eternal beauty of the work of God; and tests all work of man by concurrence with, or subjection to that." His teaching has been spread by many Ruskin societies, a Ruskin Hall for working men has been established at Oxford, and at Ruskin, Tenn., a co-operative colony was unsuccessfully attempted. Consult: Collingwood, 'Life and Work of John Ruskin' (1893); and 'Life of John Ruskin' (1900); Ritchie, 'Records of Tennyson, Ruskin, and Browning' (1892); Spielmann, 'John Ruskin' (1900); Harrison, 'Tennyson, Ruskin, Mill, and Others' (1899); Rossetti, 'Ruskin, Rossetti, and Pre-Raphaelitism' (1899); Cook, 'Studies in Ruskin' (2d ed. 1891); Hobson, 'John Ruskin, Social Reformer' (1898); Mallock, 'New Republic' (1881—Herbert stands for Ruskin); Sizeranne, 'Ruskin et la Religion de la Beauté' (1897; Eng. trans., 1899); Smart, 'A Disciple of Plato' (1883); Waldstein, 'The Work of John Ruskin' (1894); Mather, 'Life and Teaching of John Ruskin' (5th ed., 1898); Harrison, 'John Ruskin' (1902; 'English Men of Letters,' new series); Mackail's essay in Chambers' 'Cyclopædia of English Literature' (Vol. III., 1904); Kitchin, 'Ruskin at Oxford and Other Essays' (1904).

Ruskin University, located at Glen Ellyn, Ill., a suburb of Chicago. The ideal of the institution is to unite industrial and educational work, to bring within the reach of young men and women the advantages of college education with the means of paying their own expenses chiefly from their own labor, and to teach the dignity of labor, "not as a means of livelihood only, but as the glad expression of normal life, and an absolute necessity to the acquirement of mental culture and moral character." The university had its origin in Ruskin College, established at Trenton, Mo., in 1900; it conducted there for student self-support a 2,000 acre farm, and a dairy, carried on gardening, laundering, printing, carpentering, etc., and with the co-operation of the citizens of the town established wood-working and canning factories. The larger part of the industrial equipment was not owned by the college; the college buildings also became inadequate for the increasing attendance and a new location became necessary. In January 1903 an affiliation was formed with a number of schools and colleges in Chicago under the corporate name

of Ruskin University, Ruskin College becoming the literary department of the institution; in April of that year the college was moved to Glen Ellyn. The organization of the university includes the Ruskin Industrial Guild, where employment is given in a number of occupations, printing, book-binding, cooking, laundering, horticultural and agricultural pursuits, etc. As far as possible students are given the work for which they have the most liking and aptitude. Those of the student body who become members of the Ruskin Industrial Guild are supplied with four hours of work per day on school days with an extra hour or two on Saturdays, for which they receive Ruskin script, at from 10 to 12½ cents per hour. This script they deposit in the Ruskin Industrial Bank and pay every week, their board bill and other incidental expenses, ranging from two dollars and fifty cents to three dollars per week by check upon the bank. They are required to report for duty in the industrial department just the same as for a Latin or Greek recitation, are marked by the foremen of departments as to the faithfulness in the discharge of duty and are advanced from one department to another upon the strictest sort of civil service rules. The courses offered by the University include: (1) the college preparatory course; (2) the college course, leading to the degree of bachelor of arts; (3) the normal course, leading to the degree of bachelor of pedagogy; (4) the social science course; the completion of which with work in other courses equal to the requirements of the college course, entitles the student to the degree of bachelor of social science; (5) special courses in bookkeeping and stenography, music, art, oratory, dressmaking, telegraphy, and domestic science; (6) the business course, leading to the degree of bachelor of accounts; (7) professional courses in law, medicine, dentistry, pharmacy, or the art craft, at the affiliated schools in Chicago; (8) correspondence courses. The college course is entirely elective and may be completed in three years; the completion of the special courses counts for a certain amount of credit toward the degree. The students in the college department at Glen Ellyn number about 300, and the members of the faculty 15.

Rusling, James Fowler, American soldier: b. Washington, N. J., 14 April 1834. He was graduated from Dickinson College in 1854 and was professor there until 1857, when he engaged in law practice. At the outbreak of the Civil War he entered the Union army with rank as lieutenant. He served in the Army of the Potomac in 1861-3, in the Department of the Cumberland in 1863-5, and in the war department in 1865-7. He attained rank as colonel of volunteers in 1865, was brevetted brigadier-general in 1866 and mustered out of service in 1867. He was United States pension agent for New Jersey in 1868-77 and has published: 'Across America, or the Great West and Pacific Coast' (1874); 'History of Pennington Seminary' (1890); 'Men and Things I Saw in Civil War Days' (1899); 'European Days and Ways' (1902); etc.

Russ, John Denison, American physician and philanthropist: b. Chebacco (Essex), Mass.,

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1 Sept. 1801; d. Pompton, N. J., 1 March 1881. He was graduated from Yale in 1823, studied medicine in the United States, in London, and on the Continent, in 1826 began practice in New York, in 1827-30 was in Greece aiding the patriots, and upon his return began the first instruction of the blind attempted in the United States. He was invited to organize the Institution for the Blind in Boston, but preferred to continue his independent work. In 1832 he became superintendent of the New York institution, a post which he resigned in 1838. His inventions and improvements for the assistance of the blind were widely used. Latterly he was active in endeavors to improve prison discipline and further the welfare of discharged prisoners.

Russell, rüs'el, Addison Peale, American author: b. Wilmington, Ohio, 8 Sept. 1826. He rose from a printer's apprentice to be an editor and publisher, was elected to the Ohio legislature in 1855 and in 1857-61 was secretary of state for Ohio. He has published: 'Half Tints' (1867); 'Thomas Corwin' (1882); 'Characteristics' (1883); 'In a Club Corner' (1890); 'A Club of One' (1887); 'Sub-Colum' (1893); 'Library Notes' (1875-9).

Russell, Benjamin, American journalist: b. Boston, Mass., 13 Sept. 1761; d. there 4 Jan. 1845. He was apprenticed to Isaiah Thomas, publisher of the Worcester, Mass., 'Spy,' but entered the Revolutionary army before completing his apprenticeship, and there collected war news for that paper. In 1784 he established the 'Columbian Sentinel,' which he made the most powerful organ of the Federal party in New England, and which he edited until 1828. He also established and conducted in 1795-1830 the 'Gazette,' likewise a Federalist organ. He printed the laws and state documents during the first sessions of Congress and refused to receive pay for his work until it was pressed upon him by Washington; represented Boston in the general court for 24 years; served several terms in the Massachusetts senate; was a member of the executive council, and of the Constitutional convention in 1820.

Russell, Sir Charles Arthur, BARON OF KILLOWEN, English jurist: b. Newry, Ireland, 10 Nov. 1832; d. London 10 Aug. 1900. He began his career as solicitor in 1854, later matriculated at Trinity College, Dublin, but did not graduate; and in 1856 removed to London, entered Lincoln's Inn and was admitted to the English bar in 1859. In 1872 he was made Queen's counsel, and entered Parliament for Dundalk in 1880, but his part in debate was largely confined to questions concerning Ireland. In 1885 he was returned for South Hackney and became attorney-general in Gladstone's cabinet in 1886. His speeches in behalf of home rule were his most notable parliamentary achievements. He was leading counsel for Parnell in the investigations brought about by the Parnell Commission Act of 1888, and his six days' speech concluding the trial on 12 April 1889 is accounted his greatest forensic effort. He defended the prisoner in the Maybrick murder trial; in 1893 represented Great Britain in the Bering Sea arbitration; in 1894 was made lord of appeal; was raised to a life-peerage as baron

of Killowen, and later succeeded Lord Coleridge as lord chief justice. In 1896 he delivered an address before the American Bar Association at Saratoga, on 'Arbitration: its Origin, History and Progress.' In 1899 he succeeded Lord Herschell as one of the arbitrators to determine the boundaries between British Guiana and Venezuela. His publications aside from his address on arbitration were mainly contributions to current discussions.

Russell, David Allen, American soldier: b. Salem, N. Y., 10 Dec. 1820; d. near Winchester, Va., 19 Sept. 1864. He was graduated from West Point in 1845, served in the Mexican War and in 1847 was brevetted 1st lieutenant for gallant conduct. He subsequently served on the Pacific coast, was brevetted captain in 1854, and at the outbreak of the Civil War was assigned to aid in the defense of Washington. In 1862 he was appointed colonel and served in the Peninsular campaign under McClellan. He commanded a brigade in the Rappahannock campaign, was brevetted colonel in the regular army, assisted in the capture of the Rappahannock station and commanded a division at the battles of the Wilderness, Spottsylvania, and North Anna. He was engaged in the defense of Washington in August and September 1864, and was killed while leading his column at Opequan, Va., 19 Sept. 1864. He was brevetted major-general of regular army the same day.

Russell, Henry Benajah, American journalist: b. Russell, Mass., 9 March 1859. He was graduated from Amherst in 1881, was attached to the New York *Sun* 1884-8, was on the editorial staff of the Providence *Journal* 1888-90, and of the Hartford *Post* 1890-7. He has published 'Life of William McKinley' (1896); 'International Monetary Conferences' (1898); 'Our War with Spain' (1899).

Russell, Israel Cook, American geologist: b. near Garrattsville, N. Y., 10 Dec. 1852; d. Ann Arbor, Mich., 1 May 1906. He was educated at the College of the City of New York and Columbia School of Mines, and accompanied the United States expedition to New Zealand to observe the transit of Venus. In 1875, he became assistant professor of geology at Columbia and from 1880 was attached to the United States geological survey, for which he made surveys in the Rocky Mountains, Southern Appalachian regions, and in Alaska. In 1879 he ascended the Yukon and made his way to Lyna Canal, and in 1890-1 led expeditions to Mount Saint Elias. In 1892 he became professor of geology at the University of Michigan. His contributions to geography and geology embrace 'Geological Reconnaissance in Central Oregon' (1883); 'Geological History of Lake Lahontan' (1885); 'Quaternary History of Mono Valley, California' (1887); 'Existing Glaciers of the United States' (1889); 'Sub-aerial Decay of Rocks' (1889); 'A Second Expedition to Mount Saint Elias' (1892); 'A Geological Reconnaissance in Central Washington' (1893); 'Lakes of North America' (1895); 'Present and Extinct Lakes of Nevada' (1895); 'Glaciers of North America' (1897); 'Volcanoes of North America' (1897); 'Rivers of North America' (1898).

Russell, James Earl, American educator: b. Hamden, N. Y., 1 July 1864. He was graduated from Cornell in 1887, studied at the

universities of Jena, Leipsic, and Berlin, and in 1895-7 occupied the chair of philosophy and pedagogy at the University of Colorado. He was appointed professor of education at the Teachers' College, Columbia University, in 1897, and since 1898 has been dean of that college. He has published: 'The Extension of University Teaching in England and America' (1895); 'The History, Organization, and Methods of Secondary Education in Germany' (1899); etc.

Russell, John, 1ST EARL RUSSELL, English statesman, 3d son of John, 6th Duke of Bedford: b. London 18 Aug. 1792; d. Richmond Park, Surrey, 28 May 1878. He was educated at Edinburgh University, where he trained himself to debate at the meetings of the Speculative Society. In July 1813 he entered Parliament and soon gained prominence among the politicians of the day. He early took up the subject of parliamentary reform, and supported the repeal of the Test and Corporation Acts, and Roman Catholic emancipation. In 1828 he had the satisfaction of seeing the Test and Corporation Acts repealed by the Wellington ministry, and in April 1829 the Catholic Relief Bill became law. When the Grey cabinet was formed in 1830 Lord John Russell, then paymaster-general of the forces, was elected one of a committee of five to formulate a Reform Bill. This was brought before the House of Commons 1 March 1831 by him, and though he defended it clause by clause with extraordinary vigor, it was ultimately rejected. Upon this the Whig ministry resigned, and an appeal made to the country. The elections resulted in a majority favorable to the bill, which received the royal sanction 7 June 1832. In Lord Melbourne's second cabinet (1835-41) he was at first home secretary and then colonial secretary, and on the outbreak of the Canadian rebellion, by recognizing the right of the colonists to self-government, reconciled them to the mother country. From 1841 (in which year he became member for the city of London) to 1845, during the Peel administration, Lord John Russell led the opposition, but lent his influence in favor of the repeal of the corn-laws. He was premier 1846-52, and was able to pass his Ecclesiastical Titles Bill of 1851, prohibiting the assumption of the territorial titles by Roman Catholic bishops. Lord Derby who followed him soon resigned and under the succeeding administration of Lord Aberdeen, Russell was foreign secretary for a short time. He also filled the post of lord-president of the council from June 1854 to February 1855. He was colonial secretary under Lord Palmerston in 1855, and represented Great Britain at the Vienna conferences; but his conduct of the negotiations brought him so much unpopularity that he resigned in July of that year. When Palmerston returned to power in 1859 Lord John again became foreign secretary, with a seat in the cabinet. He took a leading part in regard to such political questions as the oppression of the Poles by Russia, the aggressive policy of German powers toward Denmark, and the disputes between England and the United States as to the neutrality observed during the continuance of the Civil War. He retained his seat for the city of London from June 1841 till July 1861, when he was raised to the peerage as Earl Russell. After the death of Lord Palm-

erston 18 Oct. 1865 Earl Russell became prime minister for the second time, Gladstone taking the lead in the House of Commons. During the session of 1866, in conjunction with Gladstone, he introduced a new Reform Bill, which failing to pass the ministry, resigned, and was succeeded by that of Lord Derby. Thenceforth Earl Russell held no office in any ministry, though he always took an active part in promoting Liberal measures.

He published among other works: 'History of the British Constitution' (1821); 'Essay on the History of the English Government' (1823); 'Memoirs of the Affairs of Europe' (1824-9); 'Essay on the Causes of the French Revolution' (1832); 'Memoirs and Correspondence of Thomas Moore' (1852-6); 'The Life and Times of Charles Fox' (1859-66); 'Selections from Speeches of Earl Russell, 1859 to 1865'; 'Recollections and Suggestions, 1813-73' (1875). Consult: Walpole, 'Life of Lord John Russell' (1889); Reid, 'Lord John Russell' (1895).

Russell, John Edwards, American politician: b. Greenfield, Mass., 30 Jan. 1834; d. Leicester, Mass., 27 Oct. 1903. He was engaged in business in South America in 1857-63, and after his return to New York was interested with Benjamin Holliday in the Overland Mail enterprise. He was secretary of the Massachusetts State Board of Agriculture in 1880-7 and in the latter year was elected to Congress, but declined a renomination. He continued active in politics, but held no further public office.

Russell, John Scott, Scottish engineer and naval architect: b. Glasgow 8 May 1808; d. Ventnor, Isle of Wight, 8 June 1882. He was educated at the universities of Edinburgh, Saint Andrews, and Glasgow, graduating from the latter at 16. In 1832 he was professor of natural philosophy in Edinburgh University. During his researches into the nature of waves he discovered the existence of the wave of translation, on which he founded the wave-line system of construction of ships introduced into practice in 1835. In 1844 he removed to London, and was for many years a well-known shipbuilder on the Thames. He became joint-secretary of the Royal Commissioners for carrying out the Great Exhibition of 1851, and took a leading part in organizing it. He built the Great Eastern; was joint-designer of the first English sea-going armored frigate, the Warrior, and constructed the vast dome of the Vienna Exhibition of 1873. He published: 'The Modern System of Naval Architecture for Commerce and War' (1864-5); 'Systematic Technical Training for the English People' (1869); and 'The Wave of Translation in the Ocean of Water, Air, and Ether' (new ed. 1885).

Russell, Lillian (HELEN LOUISE LEONARD), American comic opera singer: b. Clinton, Iowa, December 1861. She sang in 'Pinafore' under E. E. Rice in 1879, and later appeared in New York at Tony Pastor's theatre. She soon became the star in the McCaull Opera Company and played leading parts in 'Snake Charmer,' 'Olivette,' 'Patience,' and 'The Sorcerer.' She sang in London in 1883 and returned to New York in 1885, from which date until 1891 she sang at the Casino in various roles. She retains

her hold as a popular favorite and in recent years has sung at Weber & Fields' music hall.

Russell, Sol Smith, American actor: b. Brunswick, Maine, 15 June 1848; d. Washington, D. C., 28 April 1902. He first appeared on the stage at Cairo, Ill., singing and playing small roles. Later he joined the Peake Family of Bellringers, and in 1866 played in Ben de Bar's stock company in Saint Louis. In 1871 he made his first New York appearance, and three years later joined Augustin Daly's company. In 1880 he appeared as a star in 'Edgewood Folks,' and adopted a style of acting that gained him wide popularity. To this natural and quiet style he adhered in his subsequent plays, such as 'A Poor Relation'; 'The Tale of a Coat'; 'Peaceful Valley'; 'A Bachelor's Romance.' His last play was the 'Hon. John Grigsby,' produced in 1899.

Russell, William, Lord, English statesman: b. 29 Sept. 1639; d. London 21 July 1683. He was educated at Cambridge, was elected to Parliament for Tavistock in 1661, and became one of the leaders of "the country party" in 1673, coming forward in opposition to the attempts of the king and his partisans to destroy English freedom through the aid of France. In 1678 he became Lord Russell, and heir apparent to the earldom of Bedford. On 14 March 1678 he seconded the motion to declare war against France, and spoke in support of it. In November 1678 he was chosen to move in the House of Commons that the Duke of York should be removed from the king's presence and councils. When the new council proposed by Sir William Temple was formed, Lord Russell was appointed one of the 30 members. He was not at first in favor of excluding the Duke of York from the succession, but finally supported the measure. He left the council at the beginning of 1680. On 26 October he spoke in favor of measures against "popery, and to prevent a popish successor" to the crown; and a week later seconded Colonel Titus' motion to disabie the Duke of York from becoming King of England. When the reaction against the Whigs took place, the government of Charles II. resolved to destroy their leaders, proceeding to do so according to the forms of law. He was arrested on the charge of having been concerned in the Rye House plot, said to have been formed by Rumbold and others, for an attack on the king and the Duke of York, and after his examination was committed to the Tower. His trial took place at the Old Bailey 13 July 1683. The charge against him was "for conspiring the death of the king, and consulting and agreeing to stir up insurrection; and to that end to seize the guards (appointed) for the preservation of the king's person." No counsel was then allowed to the accused, except on points of law; his condemnation quickly followed and he was beheaded in Lincoln's Inn Fields. Consult 'Life of Lord Russell' by Lord John Russell (1819).

Russell, William Clark, English novelist: b. New York 24 Feb. 1844. Educated at Winchester and Boulogne, he was a midshipman in the merchant service 1857-65. His first story, 'John Holdsworth, Chief Mate,' appeared in 1874 and was very successful; but he won still greater success with 'The Wreck of the

Grosvenor' in the following year. Among his numerous novels are: 'An Ocean Freeland' (1878); 'My Shipmate, Louise' (1882); 'A Sea Queen' (1883); 'An Ocean Tragedy' (1881); 'Alone on a Wide, Wide Sea' (1892); 'The Emigrant Ship' (1894); 'The Convict Ship' (1895); 'What Cheer!' (1895); 'List, Ye Landsmen!' (1897); 'The Two Captains' (1897); 'Romance of a Midshipman' (1898); 'A Voyage at Anchor' (1899); 'The Pretty Polly' (1900); 'The Ship's Adventure' (1899); 'His Island Princess' (1905); several collections of short stories, and lives of Nelson (1890) and Collingwood (1891). He was for some time connected with the Newcastle *Daily Chronicle*, but for several years, ending in 1887, was on the staff of the London *Daily Telegraph*.

Russell, William Eustis, American lawyer and political leader: b. Cambridge, Mass., 6 Jan. 1857; d. Little Palos, Quebec, Can., 16 July 1896. He was graduated from Harvard in 1877, and from the Boston University Law School in 1879, winning the Lawrence prize for the best legal essay. He was admitted to the Massachusetts bar in 1880 and began the practice of law with his father's firm. He also became an active member of the Democratic party; was elected to the common council of Cambridge in 1881, to the board of aldermen in 1883 and 1884; and was mayor of the city 1885-7. His efficient administration as mayor, and his effective campaign speeches during the Presidential campaign of 1884, had made him a prominent figure in State politics, and in 1888 he was the Democratic nominee for governor. He was defeated in that year and again in 1889, but in 1890 was elected and twice re-elected in 1891 and 1892. He took an active part in all his gubernatorial campaigns, making numerous speeches in all parts of the State. His election as governor for three successive years was an unusual testimony to his personal integrity and popularity, as the majority of the legislature and the State officials were Republicans. Several laws were passed on his recommendation, including a measure to regulate the lobby, and a law abolishing the property qualification for governor, and the poll tax. At the close of his term he resumed the practice of law, and in 1894 was appointed a member of the board of Indian commissioners. In 1896 he was one of the most active opponents of the adoption of the free silver platform at the Democratic National Convention, and distinguished himself by a remarkable speech pleading for a return to the original principles of the Democracy; he was prominently mentioned as a candidate for the presidency by those who favored the gold standard. His death occurred suddenly, shortly after the convention, and was thought to be due largely to the strain he had undergone at that time.

Russell, Sir William Howard, English journalist: b. near Dublin, Ireland, 28 March 1820; d. London, Eng., 10 Feb. 1907. He was educated at Trinity College, Dublin, and was called to the bar in 1852. His journalistic career began in 1843 on the staff of the London *Times*. He was its special correspondent during the Danish war of 1848-50, during the Crimean war, in 1854-6, reported the Indian routine in 1857-8, the Italian campaign 1859, the Civil War in the United States in 1861-2,

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the Danish war of 1864, the Prusso-Austrian war 1866, and the Franco-German war of 1870. He accompanied the Prince of Wales to Egypt in 1868 and was his honorary private secretary on his visit to India in 1875. In 1879-80 he was again engaged as war correspondent in South Africa, and in 1883-4 was on that duty in Egypt. He was knighted in 1895 and was editor of the 'Army and Navy Gazette.' His publications include: 'British Expedition to Crimea'; 'Diary in India'; 'My Diary—North and South' (1863); 'The Prince of Wales Tour' (1877); 'Hesperothen' (1882); 'The Great War with Russia' (1895); 'Tolben's Sebastopol'; etc.

Russell, House of, English noble family presumed to have descended from Turstain, a Scandinavian jarl who settled in Normandy after its conquest by the Northmen, and became possessed of the Castle of Rozel, near Caen. The name of HUGH DE ROZEL appears in a charter of Matilda, the wife of William the Conqueror, dated 1066; and also with that of his elder brother, on the roll of Battle Abbey. Both accompanied Robert of Normandy in the first crusade. The elder died there, but Hugh returned and settled in England. A descendant of his, JOHN ROZEL or RUSSELL, as the name had now begun to be written, was constable of Corfe Castle about 1221; and another WILLIAM RUSSELL represented Southampton in the first Parliament of Edward II. SIR JOHN RUSSELL, a direct descendant of the last named, was speaker of the House of Commons in Henry VI.'s reign. His grandson, SIR JOHN, was in favor with Henry VIII. The lands of the Abbey at Tavistock, and of the dissolved monastery at Woburn, were conferred on him, and he was made 1st Earl of Bedford. His son, the 2d earl, died without issue, and the title passed into another branch of the Russell family. WILLIAM RUSSELL, 5th earl, was created Marquis of Tavistock and Duke of Bedford in 1694. A notable member of the family was ADMIRAL EDWARD RUSSELL, who distinguished himself by his victory over the French fleet at La Hogue in 1692. JOHN, 4th duke (b. 1710; d. 1771), held office in the Newcastle and Grenville ministries, and was lord-lieutenant of Ireland in 1756-62. FRANCIS, 5th duke (1765-1802), was distinguished for his services to agriculture. FRANCIS, 7th duke (b. 1788; d. 1861), was summoned to the House of Lords in 1832, before the death of his father. He held no political office, but like most members of the family gave staunch support to the Whigs. The 9th duke, FRANCIS, was succeeded by his son GEORGE, the 10th duke, in 1891, and he by his brother HERBRAND in 1893.

Russell's Viper, one of the largest and most venomous serpents (*Daboia russelli*) of the East Indian region; justly dreaded throughout southern and eastern India, Ceylon, Burma, and Siam. It may reach a length of five feet, and is yellowish-brown with three longitudinal series of black, light-edged rings, which sometimes encircle reddish spots. It is known also as chain-viper, tic-palonga (Ceylon), etc., and is regarded by experts as the most deadly in India, but fortunately it is neither as numerous nor as easily provoked as the cobra. According to Fayer it is nocturnal in its habits, sluggish

and does not readily strike unless irritated, when it bites with great fury; moreover its loud hissing when disturbed is likely to give one sufficient warning to enable him to jump out of reach of its fangs. It is said to kill many grazing cattle. The action of its poison resembles that of the rattlesnake, but gives rise to hemorrhagic extravasations from the kidneys and various other organs. Consult: Fayer, 'Thanatophidia of India' (1874); Gadow, 'Amphibia and Reptiles' (1901).

Russellville, Ark., town, county-seat of Pope County; on the St. Louis, I. M. & S. and the Dardanelle & R. R.R.s; about 80 miles northwest of Little Rock. It is in an agricultural region in which the chief product is cotton. The lumber interests are quite important. The chief manufactures are cotton and lumber products, flour, dairy products, and agricultural implements. The two banks, one national and one state, have a combined capital of \$80,000. Pop. (1910) 2,936.

Russellville, Ky., city, county-seat of Logan County; on the Louisville & Nashville railroad; about 25 miles west-southwest of Bowling Green and 52 miles north by west of Nashville. It is in an agricultural region in which tobacco is one of the chief products. The chief manufacturing establishments are flour mills, tobacco factories, wagon and carriage works, and furniture factories. It contains the Logan Female College (M. E. S.), established in 1867, the Bethel College (Baptist), founded in 1854, public schools and a public library. The three state banks have a combined capital of \$175,000. Pop. (1910) 2,690.

Russellville, Engagements at. After the defeat of Gen. W. E. Jones at Morristown, Tenn. (q.v.), 10 Dec. 1863 he was followed by a Union force under Col. Graham, and when near Russellville Graham ran into Gen. Morgan's cavalry division, which was foraging. He was attacked and driven back, leaving some dead, wounded, and prisoners in the hands of the Confederates. Late in October 1864 Col. J. B. Palmer, 58th North Carolina, with about 800 men and 3 guns, moved from North Carolina into East Tennessee to co-operate with the Confederate troops under Gen. Vaughn, and 28 October he was ordered by Vaughn to take position in rear of Russellville, on the Bull's Gap road. He had scarcely taken position when Vaughn's brigade, defeated at Morristown, swept past him in great disorder. He formed line, threw out skirmishers, and opened fire with his three guns upon Gillem's pursuing troops, checking them and enabling Vaughn to rally about 200 of his men. Gen. Gillem, who, with a brigade, was at Henderson's Depot on 8 Nov. 1864, hearing that Gen. Breckinridge was advancing to reconquer East Tennessee, fell back to Greeneville on the 9th and to Bull's Gap on the 10th, where he was attacked on the morning of the 11th by Gen. Duke's cavalry brigade, and held his own during the day. The attack was renewed by Breckinridge on the 12th with artillery; he next assaulted in front and in rear with cavalry, both being repulsed. Breckinridge again renewed the attack on the 13th, and kept it up all day. Gillem, being now almost out of ammunition, and without food for his men and forage for his horses, abandoned his position during the night and fell back toward

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Russellville. He took position on the road, at its intersection with the Knoxville and Greenville road, intending to hold that point until his trains had passed it. Nearly all his trains had passed, and were going through Russellville, when, on the 14th, his rear was attacked by Breckinridge with the brigades of Duke and Vaughn. His men were thrown into disorder, became panic-stricken, could not be rallied, and retreated through Russellville to Strawberry Plains. He had 41 killed and wounded, and lost six guns, 132 wagons and ambulances, and 300 horses. About 200 of his men were captured. Consult 'Official Records,' Vols. XXXI. and XXXIX.

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Russia, an extensive empire comprising the whole of eastern Europe from about 17° 40' east, and stretching continuously for about 170 degrees over the whole continent of Asia to Bering Strait, or nearly half of the circuit of the world. The boundaries are the Arctic Ocean on the north, Bering Strait and Bering Sea on the east, the Pacific Ocean, Chinese Empire, Afghanistan, Persia, Asiatic Turkey, and the Black Sea on the south, and Rumania, Austria-Hungary, Germany, the Baltic Sea, and Sweden on the west. The length east to west is estimated at about 7,000 miles; the average breadth north to south is about 1,500 miles. The whole area is officially given at 8,660,395 square miles, approximately twice the area of Europe, and one sixth of the land surface of the globe. The empire consists of several well defined parts; in Europe, Poland and Finland (qq.v.), besides European Russia, the latter although less than a fourth of the whole, including nearly three fourths of the entire population; in Asia—northern Caucasia, Transcaucasia, the Steppes, Turkestan, the Caspian and Transcaspian, and Siberia. The appended table gives the official divisions of the empire, their area, population, and the density per square mile of land; the areas occupied by water are included in the total, but the densities of the population are calculated on the land area.

GOVERNMENT OR PROVINCE	Area: English sq. miles	Domiciled Population	Density per sq. mile
1. European Russia—			
Archangel	331,640	347,589	1
Astrakhan	91,327	994,773	11
Bessarabia	17,619	1,933,436	113
Chernigov	20,233	2,321,900	115
Courland	10,535	672,634	64
Don, Region of the	63,532	2,575,818	41
Ekaterrinoslav	24,478	2,112,652	86
Estonia	7,818	413,724	54
Grodno	14,931	1,617,859	109
Kaluga	11,942	1,185,726	99
Kazan	24,601	2,191,058	89
Kiev	19,691	3,576,125	181
Kostroma	32,490	1,429,228	44
Kovno	15,692	1,549,444	100
Kursk	17,937	2,396,577	134
Kharkov	21,041	2,509,811	119
Kherson	27,523	2,732,832	100
Livonia	18,158	1,300,640	74
Minak	35,293	2,156,123	61
Mogilev	18,551	1,708,041	92
Moscow	12,859	2,433,356	189
Nijni-Novgorod	19,797	1,600,034	81
Novgorod	47,236	1,392,933	33
Olonez	57,439	366,715	7
Orel	18,042	2,054,749	114
Orenburg	73,816	1,609,388	22
Penza	14,997	1,491,215	99
Perm	128,211	3,003,208	24

GOVERNMENT OR PROVINCE	Area: English sq. miles	Domiciled Population	Density per sq. mile
Podolia	16,224	3,031,513	187
Poltava	19,265	2,794,727	145
Pskov	17,069	1,136,540	68
Ryazan	16,255	1,827,539	113
Saint Petersburg	20,760	2,107,691	123
Samara	58,321	2,763,478	46
Saratov	32,624	2,419,884	74
Simbirsk	19,110	1,549,461	81
Smolensk	21,638	1,551,068	72
Tambov	25,710	2,715,453	106
Taurida	24,497	1,443,566	62
Tula	11,954	1,432,743	120
Tver	25,225	1,812,825	73
Ufa	47,112	1,220,497	47
Vilna	16,421	1,591,912	98
Vitebsk	17,440	1,502,816	89
Vladimir	18,864	1,570,733	84
Volhynia	27,743	2,997,902	109
Vologda	155,498	1,365,887	9
Voronezh	25,443	2,546,255	109
Vyatka	59,329	3,082,788	52
Yaroslavl	13,751	1,072,478	78
Sea of Azov	14,520	.....	.....
Total Russian Provinces ..	1,902,202	94,215,415	51
2. Vistula Prov.—			
Kalisz	4,392	846,719	194
Kielce	3,597	763,746	196
Lomza	4,667	585,781	144
Lublin	6,501	1,159,463	177
Piotrkow	4,729	1,409,844	297
Plock	4,200	556,877	153
Radom	4,769	820,363	171
Siedlce	5,535	775,316	140
Swwalki	4,846	604,945	127
Warsaw	5,523	1,933,689	286
Total, Poland ..	49,159	9,455,943	193
Total, Russia and Poland ..	1,951,361	103,671,358	53
3. Grand-duchy of Finland—			
Abo-Björneborg	9,333	430,194	47
Kuopio	16,499	305,166	22
Nyland	4,584	276,335	61
St. Michel	8,819	186,478	28
Tavastehus	8,334	285,281	40
Uleaborg	63,957	268,226	4
Viborg	13,530	394,412	33
Vasa	16,105	446,772	30
Lake Ladoga	3,094	.....	.....
Total Finland ..	144,255	2,592,778	20
Total European Russia	2,095,616	106,264,136	51
4. Caucasus—			
Kuban	36,442	1,022,773	54
Stavropol	23,398	876,298	38
Terek	26,822	933,485	35
Baku	86,661	3,732,556	43
Black Sea	15,095	789,659	53
Daghestan	2,836	54,228	.....
Elizabetspol	11,332	586,636	58
Erivan	16,721	871,557	52
Kars	10,075	804,757	101
Kutais	7,308	292,498	43
Tiflis with Zakataly	13,068	1,075,861	54
Caucasus	180,843	9,248,695	54
Akmolinsk	229,609	678,957	3
Semipalatinsk	184,631	685,197	4
Turgai	176,219	453,123	3
Uralsk	139,168	644,001	4
Lake Aral	26,166	.....	.....
The Steppes	755,793	2,461,278	3
Samarcand	26,627	857,847	39
Ferganah	35,654	1,560,411	43

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GOVERNMENT OR PROVINCE	Area: English sq. miles	Domiciled Population	Density per sq. mile
Syr-Daria	194,853	1,479,848	7
Semiryechensk ..	152,280	990,107	7
Turkestan	409,434	4,888,183	12
Trans-Caspian ...	214,237	372,193	2
Caspian Sea	169,381	.....	....
Total, Central Asian domina- ions	1,548,825	7,721,684	5
Tobolsk	539,659	1,438,484	3
Tomak	331,159	1,929,092	6
Western Siberia ..	870,818	3,367,576	4
Irkutsk	287,061	506,517	2
Transbaikalia	236,868	664,071	3
Yakutsk	1,533,397	261,731	2
Yeniseisk	987,186	559,902	1
Eastern Siberia ..	3,044,512	1,992,221	7
Amur Region ...	888,830	339,127	3
Sakhalin	29,336	28,166	1
Total, Siberia..	4,833,496	5,727,090	1
Total, Asiatic dominions ...	6,564,778	22,697,469	4
Russians in Fin- land, Bokhara, Khiva, and in the navy abroad	.....	42,909	....
Grand total ...	8,660,395	129,004,514	15

Imperial expansion in Asia has been a marked feature of Russian policy since the 18th century. The first settlements on the Pacific slope were established on the Sea of Okhotsk, and by 1859 the boundaries were pushed so far south as the Amur River. In North America, Russia had extended its sovereignty over the Alaskan Peninsula, which, however, it sold in 1867 to the United States for \$7,200,000. (See ALASKA and ALASKAN BOUNDARY COMMISSION.) In 1872 it compelled Khiva (q.v.) to acknowledge the suzerainty of the Czar, and in the following year Bokhara (q.v.), on which pressure had been brought to bear since 1850, and which had been invaded in 1866, became practically a Russian dependency. In 1875, the island of Sakhalin in the Sea of Okhotsk, north of Japan, was ceded to Russia by the Japanese. In 1898, after Japan's successful war with China, Russia obtained from Japan a lease of the Liao-tung peninsula, with the important ports of Dalny and Port Arthur (qq.v.), and after the Boxer uprising of 1901, occupied Manchuria (q.v.). Meanwhile Armenia had been partly absorbed; Russian influence had been strongly established in the Mongolian steppes, and the military outposts in Turkestan had been extended southward in the Pamirs.

The largest cities of European Russia are the capital, Saint Petersburg, 1,267,023; Moscow, 988,614; Warsaw, 638,209; Odessa, 405,041; Lodz, 315,209; Riga, 256,197; Kiev, 247,432; Kharkov, 174,846; Vilna, 154,532; Saratov, 137,109; Kazan, 131,508; Ekaterinoslav, 121,216; Rostov-on-the-Don, 119,889; Astrakhan, 112,880; Tula, 111,048; Kishinev, 108,796; Nijni-Novgorod, 95,124. The cities of Asiatic Russia above 100,000 population are Tiflis, 160,645; Tashkend, 156,414; and Baku, 112,253.

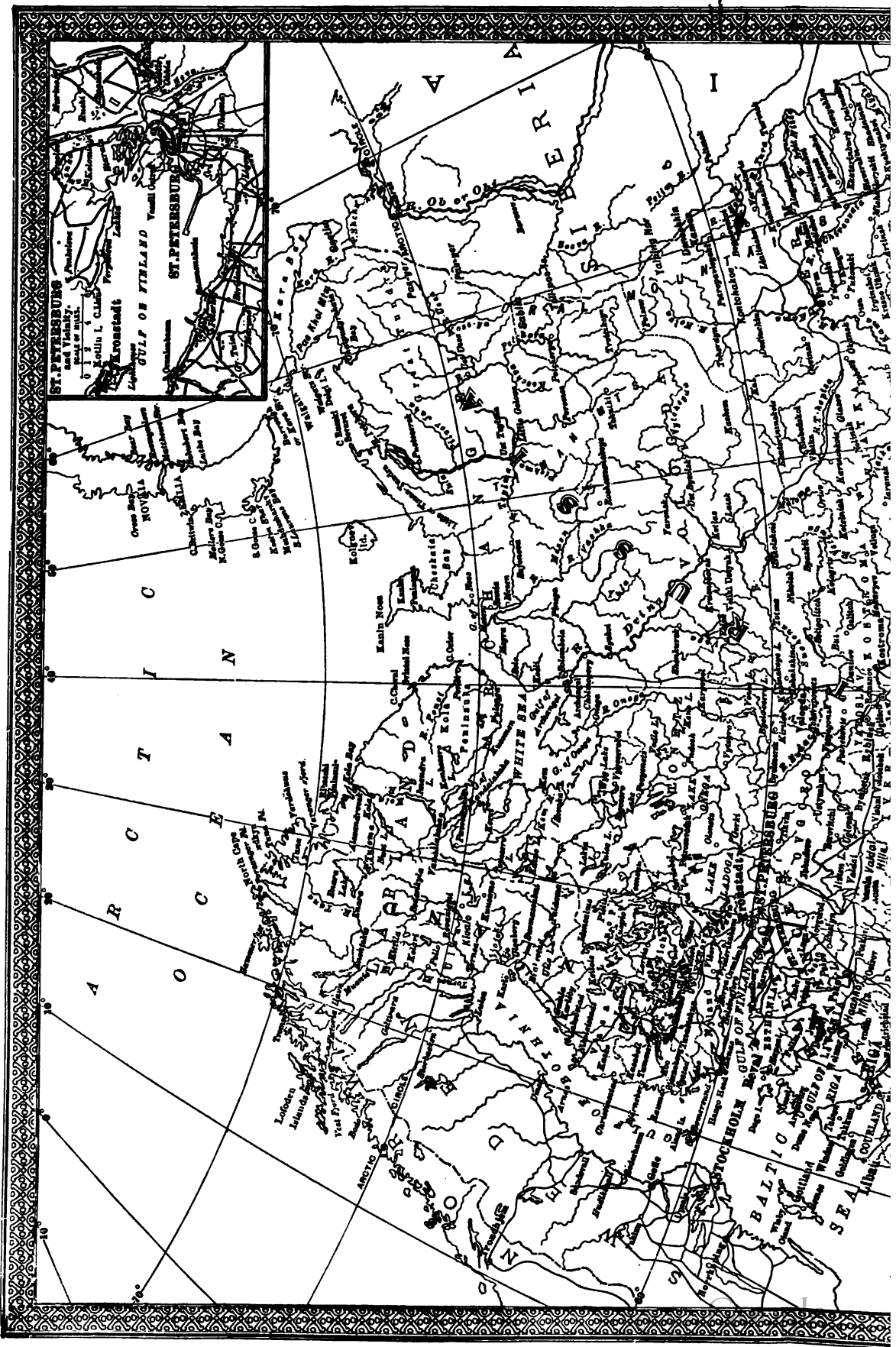
The continuity of the empire might appear to demand a detailed description in a single article; but its immense magnitude, and the distinct names commonly used to designate the different portions, make it more convenient to consider them separately under the heads of European Russia, and Siberia and Asiatic Russia. See article SIBERIA AND ASIATIC RUSSIA.

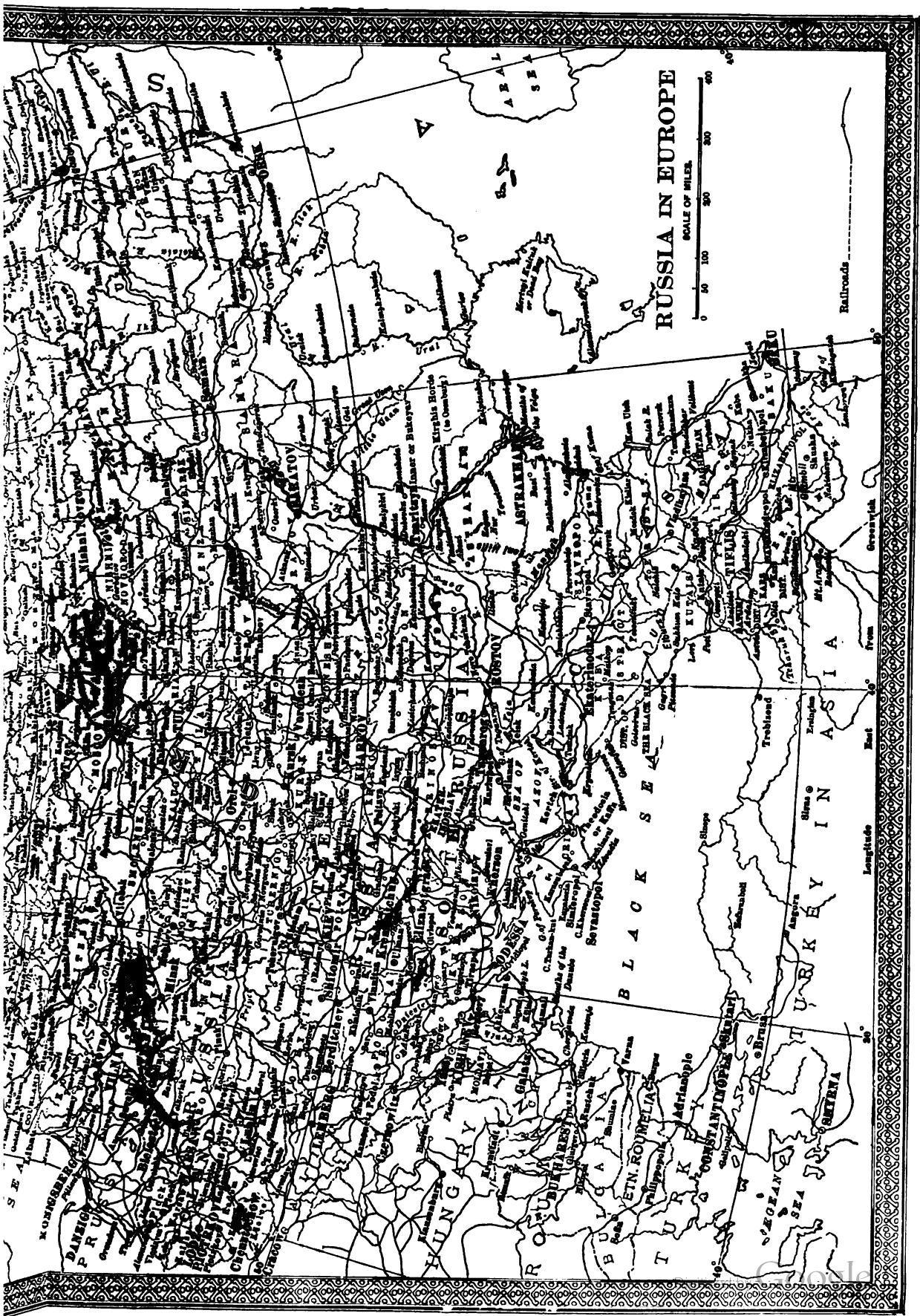
EUROPEAN RUSSIA.

Various classifications, partly historical and partly geographical, of the numerous divisions of European Russia, besides Poland and Finland, include Great Russia, Little Russia, South Russia, West Russia, the Baltic Provinces, and Caucasus.

The boundaries of European Russia on the north and west are the same as those given above for the empire. Its southern boundaries also are the same as far east as the eastern shores of the Caspian Sea. The eastern boundary is not so well defined. In its northern part the Ural Mountains form such a definite natural barrier that their title to fix the frontiers of Europe and Asia, so far at least as the governments Archangel and Vologda extend, has been almost universally recognized. To the south of this the boundary may be said to be almost arbitrary, but is generally conceded to follow the Ural chain southward till it reaches the sources of the river Ural, and then follow the course of this river to its mouth in the Caspian. Parts of the governments of Perm and Orenburg, however, extend across the Ural Mountains, and are therefore in Asia. European Russia, as thus defined, is bounded northeast by the Ural Mountains, east by the government of Tobolsk, the steppes of the Kirghiz, and the Caspian Sea.

Topography.—The surface, in the most general view that can be taken of it, is two immense plains, the boundary between which is marked, though not very definitely, by a broad central ridge which stretches across it in an irregular waving line, mainly in a northeast direction, commencing on the frontiers of Poland, and terminating on the west side of the Ural Mountains, near lat. 62° N. This ridge forms the eastern continuation of the great watershed which divides the whole continent of Europe into a north and a south basin; but, unlike the west part, which is composed of lofty mountain chains or elevated plateaus, is only of moderate height, never exceeding 1,000 feet above sea-level. Even this height is attained only in the Valdai Hills, the far greater part of which, and of the remainder of the ridge, has an average height of not more than 500 feet. The only regions where the surface assumes a mountainous appearance are in the east, where the Ural chain, though nowhere much exceeding 5,000 feet, looks more elevated, at least in its northern part, from its high latitude and consequent covering of perpetual snow; and in the south, where the Mountains of the Yaila chain, lining the southern shores of the Crimea, have a height of about 4,000 feet. With these exceptions the only other parts of European Russia which, according to the limits above assigned to it, do not belong to its two immense plains, are those districts of Perm and Orenburg which are situated on the east side of the Urals, and slope toward the almost boundless steppes of Asia. The coast-





RUSSIA IN EUROPE

SCALE OF MILES
0 40 100 200 400

Railroads

Longitude

East

from

Greenwich

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line of European Russia was confined to the Arctic Ocean until the end of the 17th century, and it was only by conquest that Russia obtained a seaboard on the Baltic and the Black Sea; the latter, however, remains practically an inland sea, the entrance to which is in the hands of Turkey. The Arctic Ocean, affording excellent fishing grounds in the western portion, makes, with the White Sea, a deep indentation on the north coast, but its gulfs, Kandalaksha, Onega, and Dvina, are ice-bound for nine months every year. Archangel, the chief port, is comparatively unimportant. Farther east, Cheskaya and Pechora bays are surrounded by frozen deserts. The Kara Sea, between the crescent-shaped island of Nova Zembla and the coast of Siberia, is navigable for a few weeks only every year. The islands of Kolgueff, Vainach, Nova Zembla, and the islands of Siberia are uninhabited. The Baltic Sea, with the Gulfs of Bothnia, Finland, and Riga, is the chief sea of Russia; but it nowhere touches purely Russian territory, its coasts being peopled by Finns, Letts, Esthonians, and Germans. Nevertheless, four out of the five chief ports of Russia—Saint Petersburg, Reval, Libau, and Riga—are situated on the Baltic Sea. Three of them are frozen during four to five months every year; and Libau is the only one which has its roadsteads open nearly all the year round. The chief islands of the Baltic are the Åland archipelago, belonging to Finland; Dagö, Osel, Mohn, and Worms at the entrance of the Gulf of Riga; Hochland and Kotlin (with the fortress of Cronstadt) in the Gulf of Finland.

The Black Sea acquires more and more importance every year. The fertile steppes of its littoral are being rapidly settled, and the centre of gravity of Russia's population is gradually shifting south. The Black Sea suffers, however, from a lack of good ports. Its great gulf, the Sea of Azov (ports Taganrog and Rostoff), is very shallow; the fine ports of the Crimea are too remote from the mainland; and the seaboard of Northern Caucasus is separated from the interior by a high chain of mountains. Odessa is the chief port of this sea; and it has no rival in Russia except Saint Petersburg. Nikolaiev is the principal naval arsenal; and Sebastopol remains a naval station. Batum, the chief port of Transcaucasia, is of great importance for the export of petroleum. The Caspian Sea, which receives the chief river of European Russia—the Volga—is a valuable medium of communication between the central Asian dominions of the empire and the Caucasus, as also for trade with Persia (to which the south coast belongs); but it has no outlet to the ocean, nor is there any probability of connecting it advantageously by canal with the Black Sea, its level being 70 feet below sea-level.

Hydrography.—The rivers are remarkable for their number and magnitude. The broad central ridge already referred to forms the great water-shed of the country, sending the waters on its north side either to the Arctic Ocean or Baltic Sea, and those on the south side to the Black Sea or the Caspian, thus forming four distinct basins. The Arctic Ocean receives directly the Pechora, which drains chiefly the western slopes of the Ural Mountains by a number of important affluents, accumulates them into one great flood, which then flows almost due north, and empties

itself into a wide estuary remarkable for the number of islands which the alluvial deposits of the river have formed within it. Through the White Sea, the Arctic Ocean receives the waters of the Mezen, Northern Dvina, and Onega. The most important of the three is the Dvina, which, receiving its supplies in nearly equal quantities from the east of the Vitchevga, and from the west by the Suchona, proceeds northwest in a circuitous course, continually augmented by large affluents, and falls into the Gulf of Archangel, a little below the well-known port of that name. The surface drained by the rivers of this basin is almost entirely confined to the two extensive governments of Archangel and Vologda. The basin next in order is that of the Baltic. Its principal rivers are the Kemi and Tornea (the latter common to both Russia and Sweden), which fall into the Gulf of Bothnia; the Kymmene, Neva, and Narva or Narowa, which fall into the Gulf of Finland; the Aa and Düna or Western Dvina, which fall into the Gulf of Riga; the Niemen or Memel, which enters Prussia before terminating its course; and the West Bug, an affluent of the Vistula. To the basin of the Black Sea belong the Dniester, South Bug, and Dnieper, which have all their mouths at a short distance from each other in the neighborhood of the rising seaport of Odessa; the Don, which falls into the northeast extremity of the Sea of Azov; and the Kuban, which derives its chief supplies from Circassia. The last basin, that of the Caspian, is in some respects the most remarkable of all, since, though Europe sends it only two large rivers, the Ural and the Volga, both supplied in part from Asiatic sources, the latter not only surpasses all other Russian rivers, but is one of the greatest of Europe. The lakes of Russia are on a scale of magnificence commensurate with that of the rivers. To say nothing of the Caspian, which, being wholly surrounded by land, and even incapable from the lowness of its level, of discharging itself into any other sea, is truly a lake—Russia has others of vast extent. To the basin of the Baltic belong Ladoga, the largest lake in Europe; Onega, Peipus, and Ilmen. Finland, too, which toward its south extremity is a mere network of lakes, sends all its waters to the Baltic. Almost all the other lakes of any size belong to the basin of the Volga; chief of these are the Bielo-Ozero, in the government of Novgorod, and the Koubinsköe, in the government of Vologda. In the south are several large salt lakes, among them the Elton and the Khaki Salt Marsh, in the government of Astrakhan.

Geology.—A vast tract of gneiss and other crystalline schists, penetrated by granite, extends west from the Gulf of Bothnia, and north from the Gulf of Finland over the whole principality of the latter name, the western part of the government of Olonets, and the extensive part of the government of Archangel which is isolated from its main body by the White Sea. The only other region where a similar development occurs is in the south, where a large granitic steppe stretches in a southeast direction. It commences near Ovrutch, in the northeast of the government of Volhynia, covers the far greater part of the government of Kiev, as much of the government of Podolsk as lies north of the Bug, the northern half of the government of Kherson, the west and south of Ekaterinoslav, and a part

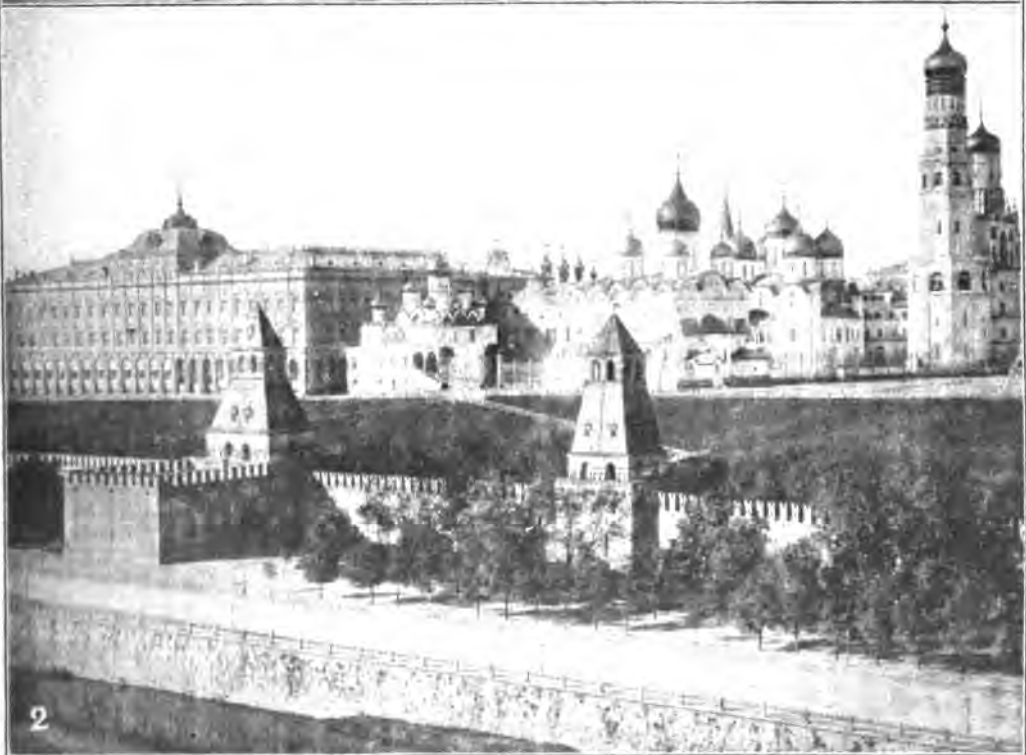
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of Taurida, and terminates just before reaching the shores of the Sea of Azov, from which it is excluded by a narrow belt of Tertiary marls and limestone. In the east, however, and along the whole crest of the Ural Mountains, from their commencement on the shores of the Arctic Ocean, and almost continuously southward to their last ramifications, granite of more recent origin than that already mentioned occurs, in connection with other eruptive rocks of greenstone, porphyry, syenite, serpentine, etc. These rocks are overlain on both sides of the chain by metamorphic schists, forming long and narrow belts nearly parallel with its principal axis. Immediately to the west appears a similar belt of Silurian strata, which, where lowest in the series, are in the state of chloritic and talcose schists. The only other locality where the Silurian system receives a marked development is on the southern shores of the Gulf of Finland, where it stretches from its western extremity east along the governments of Esthonia and Saint Petersburg, and is then continued across the isthmus between the eastern extremity of the gulf and Lake Ladoga, and along the southern and south-eastern shores of that lake. In immediate contact with this Silurian formation on the south, but on a much more magnificent scale of development, appears the Devonian system, or Old Red Sandstone. The main body of this formation commences near the southeastern shores of the Baltic, and gradually widens out with its north-eastern and southeastern sides, so as to assume the shape of a wedge. It then forms a wide fork, sending one of its branches northeast across Lake Onega, and along Archangel Bay to the northwestern extremity of Mezen Bay, and the other southeast to the northwestern frontiers of Voronezh. It thus covers continuously the whole of the governments of Kurland, Livonia, Vitebsk, and Pskof, and parts of Vilna, Minsk, Mohilef, and Smolensk, on the one side, and of Petersburg and Novgorod on the other; while its northeast branch traverses Olonets, and penetrates into Archangel; and its south-east branch stretches over considerable parts of Kaluga, Orel, and Tula. The only other localities in which the same formation occurs is as a belt stretching south-southeast from the eastern coast of the Gulf of Tcheskaia in the Arctic Ocean, and in a longer but narrower belt on the western side of the Ural chain, where it immediately overlies the Silurian formation already mentioned. The formation next in order is the Carboniferous. The main body of it lies within the above fork of the Old Red Sandstone, and in immediate contact with it, and then keeping parallel with the northeast branch of the fork, is continued in the same direction to its termination in Mezen Bay. It occupies the whole of the government of Tver, the capital of which is situated near its centre; and large parts of Smolensk, Kaluga, Tula, and Riazan on the one side, and of Novgorod and Olonets on the other. The government of Moscow is situated in the very heart of it, and that of Vladimir on its eastern side. It is evidently continued beneath these governments, and covers part of their surface, the other and far greater part being covered by oolite or Jura limestone. The Carboniferous system occurs in other two distant and isolated localities; the one in the south, a little north of the Sea of Azov, where

it occupies the eastern part of the government of Ekaterinoslav, and the western extremity of that of Don Cossacks, and where, too, the coal forming the characteristic mineral of the system is partially worked by pits; the other locality is on the western side of the Ural chain, where, in the ascending series, it succeeds the Silurian and Devonian systems, and has a larger development than either of them. This development of the Carboniferous system on the side of the Ural chain, and the still larger development above described as existing in the governments of Smolensk, Kaluga, etc., form the opposite boundaries of a system which in European Russia is highly developed; and to which from the large space which it covers in Perm and the contiguous governments, the name of the Permian system has been given. Its rocks belong to the upper part of the coal measures, and consist chiefly of magnesian limestone and new red sandstone. The latter name is still often applied to the whole system. The Permian system extends over the governments of Kostroma, Viatka, and Kazan, and large parts of Archangel, Vologda, Yaroslav, Nijni-Novgorod, Simbirsk, Orenburg, and Perm. In the north of the governments of Kostroma and Viatka, and more especially in the part of Vologda between the towns of Nikolak and Ust-Sisolsk, it disappears for a time beneath strata belonging to the Jurassic or oolitic system. This system is developed partially in several other localities, and very largely in the northeast of the government of Archangel. Immediately above it in the geological series is the Cretaceous system, of which the principal localities are Chernigov, Orel, Kurak, Kharkov, and Voronezh, near the centre; Volhynia and a small part of Poland in the west; and a long tract along the northern base of the Caucasus. The rocks next in succession belong to the Tertiary formation, which in both its Eocene and Miocene periods is very largely developed. Strata of the Eocene period, commencing in the east in the government of Simbirsk, stretch west over the greater part of the governments of Penza and Tambov, then, after a considerable interruption, reappear on the frontiers of Kursk and Kharkov, cover the far greater part of the governments of Chernigov and Poltava, and are thence continued without interruption into the governments of Mohilev, Minsk, Grodno, and finally into Poland. The Miocene period has its chief developments in Volhynia, Podolsk, and Bessarabia. Beds of still more recent formation may be traced in the limestones, marls, and clays on the northwestern shores of the Black Sea, on the far greater part of the Peninsula of the Crimea, on the eastern and northern shores of the Sea of Azov, on the low flats along the western and northern shores of the Caspian, and the low, sandy steppes of Astrakhan. Mere alluvial deposits, of comparatively recent date, are to be found in a greater or less degree at the mouths of all the rivers, and are particularly discernible in the great estuary of the Pechora. Vast numbers of erratic blocks and similar drift are spread over the greater part of Northern Russia, evidently transported from Finland, Lapland, and Sweden.

Minerals.—These are numerous and valuable. Gold is obtained in large quantities, both by mining and washing, on the slopes of the

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1. The Cathedral of the Annunciation, Moscow.

2. The Kremlin, Moscow.

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Ural Mountains. The richer deposits, however, with a few exceptions, are found on the east side of the chain, and therefore belong more properly to Asiatic than to European Russia. Gold has also been found in the northwest of Russian Lapland. Copper is found both in the Valdai and the Ural Mountains. To the west of the latter, in all the low country of Perm, are vast cupriferous deposits, from which large quantities of metal are annually obtained under the most favorable circumstances, the workings themselves being not only comparatively easy, but all the materials necessary for smelting existing in their immediate vicinity. The governments of Olonets, Viatka, Kazan, Vologda, and Orenburg have also their copper mines. Iron, the most widely diffused of all the Russian metals, is found not only among the mountains, but in the lowest marshy grounds of Finland and the northern governments, where extensive beds of bog iron ore have been formed. The principal seat of the iron manufacture is in the government of Perm, but important workings are carried on, and great numbers of blast-furnaces have been erected, in many other quarters. Near Zlatoust, to the west of the Urals, there are important limonite deposits; but east of the Urals, at Nijni Tagilsk, magnetite is worked. Lead is more sparingly diffused, and is worked chiefly in the Ural chain and some parts of Poland, particularly the vicinity of Cracow and Sandomir. It sometimes contains such a percentage of silver as to make it worth extracting. Platinum has long been worked in the Ural chain, in the most productive mines of that metal which are known to exist in the world. Zinc is worked in Poland, in the government of Piotrkov, and quicksilver is mined in the south, in the government of Ekaterinoslav. The latter government also yields a considerable amount of manganese. Salt is found in inexhaustible abundance, both in brine pits and mines. In almost every part of the vast extent of surface already described as belonging geologically to the Permian system it may easily be found, and in numerous localities is extensively and profitably worked. It is also very abundant in the southeastern steppes. Salt-peter is found chiefly in the government of Astrakhan. From the vast extent of country which has been shown to be occupied by the Carboniferous system it may be reasonably concluded that many extensive coal fields must exist. It would seem, however, that Russia in this respect bears a considerable resemblance to Ireland, where the large developments of the Carboniferous system are chiefly confined to its lower strata, and is much more remarkable for its immense masses of mountain-limestone than its productive seams of coal. The most important and most productive coal basin is that situated north of the Sea of Azov, and traversed by the river Donetz. It has an area of over 10,000 square miles, and yields bituminous coal in the west and anthracite in the south. Its production has greatly increased in recent years. Rostov and Mariupol are the ports of this region. Another valuable coal basin is that of Dombrovo, in southwestern Poland, and there is a less productive one in the south of the government of Moscow. The coal district to the west of the Urals is traversed by a line of railway. In the centre of the beet-root sugar producing country, about Kiev and Elizabethgrad,

is another vein of coal. With the increase and improvement of railway communication the output of coal has shown a marked increase. For 1868 the output for Russia (Poland excepted) was only 147,500 tons; in 1872 it reached 530,000 tons; and in 1899 it had increased to 13,705,000 tons. The chief obstacle to a more general use of coal throughout the empire is the expensiveness of transport by rail, which frequently even surpasses the price of the coal. For the smelting of metals the boundless forests furnish a more valuable and convenient material; and many years must elapse before these can be so much thinned as to make either the search for coal or the working of it objects of paramount importance. Naphtha springs are found in the province of Archangel, in that of Samara and elsewhere, but the better known and richer naphtha or petroleum springs are situated to the north and south of the Caucasus range, especially in the country around Baku. In this region there are immense underground stores of the valuable fluid, and the petroleum industry has developed enormously in recent years, so that since 1868 the output of Russian petroleum has exceeded that of the United States. In 1891 the United States produced 62 per cent, Russia 38 per cent of the total, while in 1901 the United States produced 38 per cent, and Russia 62 per cent, the situations being exactly reversed in ten years. The only other mineral products deserving of notice are quarries of granite and marble, both of which of excellent quality, are found near the shores and to the northeast of Lake Ladoga; and kaolin, which is worked in the governments of Kherson and Chernigov.

Climate.—As the country extends over 35 degrees of latitude, from the warmer regions of the temperate far into the regions of the frozen zone, it exhibits several marked diversities of climate, usually considered in four divisions—a polar region, including all the country north of latitude 67°; a cold region, extending from latitude 67° to 57° N.; a temperate region, from latitude 57° to 50° N.; and a warm region, from latitude 50° to 37° N. The characteristic features of the climate in general are a greater coldness and variability than is common under the same latitudes in the more westerly parts of Europe. The mean annual temperature of the upper part of the Norwegian coast to its extremity at the North Cape is above the freezing point, whereas a considerable portion of Russia within the same, and even in a lower latitude, is below it. This is true of the whole of Russian Lapland as far south as 66°; and to the east of the White Sea the thermal line, indicating a mean annual temperature of freezing, descends so rapidly that on reaching the Ural Mountains it is found to be as low as 60°. The region to which the name of cold has been given has a mean annual temperature varying between 32° and 40°, but very unequally divided throughout the year, the cold in winter often sinking the thermometer to 30° below zero, or 62° below freezing, while the summer heat often raises it above 80°. At Saint Petersburg, considerably below the centre of this region, the mean annual temperature is rather above 40°; on the other hand, that of Kazan, situated at the very south extremity of the region, but much farther inland, is rather

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below 36°. The temperate region, situated between lat. 57° and 50° N., has a mean annual temperature varying from 40° to 50°, and includes within it the far finest part of the Russian territory, though even there the thermometer has a very wide range, the summer heat, which suffices to grow melons and similar fruits in the open field, being often succeeded by very rigorous winters. The warm region, extending from 50° southward, well merits the name from its extreme summer heats, the thermometer in June and July standing commonly about 100°, and often considerably higher. It is not, however, free from the remarkable contrasts which a Russian summer and a Russian winter exhibit; for the Sea of Azov, situated almost in the heart of this region, usually freezes about the beginning of November, and is seldom open again before the beginning of April. In all the countries bordering on the shores of the Baltic Sea and the Arctic Ocean, and bounded on the west and north by the basin of the Volga, the air is charged with a superabundance of moisture, which descends in mists and frequent falls of rain or snow. Toward the centre, and still farther east, the superabundance of moisture disappears, though enough still remains to keep vegetation in full vigor even at the hottest season. Still farther south the want of rain is often felt, and long-continued droughts do frequent mischief. In general, however, the climates of all the regions are not unfavorable to health.

Forestry and Flora.—Forests are found chiefly in the more northern governments, particularly Archangel, Vologda, and Perm, and cover about 39 per cent of the total area of European Russia. In many of the central and southern governments a deficiency of timber is seriously felt, and many extraordinary expedients are resorted to in order to obtain adequate supplies of fuel. The governments most imperfectly provided with wood are Esthonia, Bessarabia, Kherson, Ekaterinoslav, and Astrakhan. The prevailing trees of the northern forests are fir, larch, alder, and birch. The oak is seldom found beyond lat. 61°. A considerable proportion of the surface still continues almost in a state of nature; and, where it is well wooded, it is a question whether any other mode of occupation would be equally productive. Russia possesses a vast number of phanerogamous plants, but the examination which botanists have made is incomplete and it is probable that many remain to be discovered.

Fauna.—Animals, both domestic and wild, are numerous in Russia. Among the latter are the bear, the wolf, wild hog, the desman, the mole-rat, the saiga, the bobak or Russian marmot, the elk, the bison, the lynx, and various animals which are hunted for their furs. Wild fowl abound, particularly near the mouths of rivers; among them the pelican frequents the shores of the Black Sea. Both on the coasts and in the rivers a great number of productive fisheries are carried on. In the Arctic Ocean whales are killed, and vast numbers of seals are taken. The rivers of the Caspian, particularly the Ural and Volga, and the Sea of Azov, are celebrated for their sturgeon. In the same quarters are also important salmon fisheries.

Land Tenure.—The political divisions of the Russian people comprise numerous grades of nobility, which are partly hereditary and partly

acquired by military and civil service, especially the former, military rank being most highly prized in Russia. The clergy, both regular and secular, form a separate privileged order. The higher clergy were formerly possessed of great wealth, but much of their property was confiscated by Catharine II., who compensated them by state pensions. Previous to the year 1861 the mass of the people were serfs subject to the proprietors of the soil. The Emperors Alexander I. and Nicholas took the same initial steps toward the emancipation of this class; but a bold and complete scheme of emancipation was begun and carried out by Alexander II. The decree of emancipation was dated 3 March 1861, and began to come into execution within two years. There were about 22,000,000 of serfs belonging to private proprietors, and rather more than that number on the crown lands. By an imperial decree of 8 July 1863, lands were granted to the peasants on all the estates of the crown on a 49 years' rental equal to the former poll-tax, and as a freehold estate at the expiration of this period. A similar arrangement was made on behalf of the peasants on the lands of private proprietors. The redemption money of the serfs with their land was estimated at 16¾ years' purchase of their annual produce. Twenty per cent of this had to be paid by the serfs on procuring their emancipation, the remaining 80 per cent is guaranteed by the government, which levies it from the peasantry in a tax extending over 49 years. The emancipation of all the serfs on these terms was arranged for by July 1865, and from that date this form of servitude has ceased to exist in Russia. Since this change the cultivable land in Russia is mainly distributed among three classes. The crown holds nearly 35 per cent, the emancipated peasants about 20, while the remainder, with the exception of mines and town lands, is in the hands of the nobility and other landed proprietors.

Agriculture.—Russia is decidedly an agricultural country. Its progress in the science of agriculture has been slow, and the amount of produce obtained is due more to the natural fertility of the soil than to any ability displayed in extracting it; there being perhaps no country in Europe in which so much grain is obtained at so small an expense of skill and labor. In Livonia, however, and the Baltic provinces generally, and in some of the more celebrated wheat districts of the Ukraine, an improved husbandry has been introduced, and government, by the appointment of agricultural chairs in the universities, and the formation of model farms, is laudably endeavoring to extend the movement to other quarters. After deducting all the regions where the rigors of the climate, without making the growth and ripening of grain absolutely impossible, are incompatible with its culture as a regular branch of industry, vast tracts of land remain, where the soil is almost of inexhaustible fertility, and all the cereals are produced in such abundance as not only to meet the home consumption but leave a large surplus for export. The most important crops raised for food are rye, wheat, barley, oats, buckwheat, maize, and potatoes; and for other purposes, hemp, flax, hops, tobacco, and beet-root for sugar. The principal wheat districts are parts

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of Poland, particularly the governments of Warsaw, Radom, and Lublin; the fertile alluvial tracts along the banks of northern rivers; and the governments of Volhynia, Podolsk, Kiev, and Poltava. Rye, from its natural adaptation to the soil, and its almost universal use as an article of food, is cultivated in every quarter up to lat. 65°. Barley ripens in lat. 67°, but is in far less general repute than rye. Oats are extensively grown in several governments, and more especially in the rich alluvial tracts of Archangel, where the peasants, after satisfying their own wants, grind the surplus into meal, and export it in considerable quantities to the coast of Norway. Maize forms one of the most important crops of Bessarabia, where a return of sixty-fold is said not to be uncommon. Potatoes are largely grown in Saratov, in Poland, and in the districts which border the Baltic; in the last partly for food, but much more for the supply of numerous distilleries, which are employed in converting them into brandy. Both hemp and flax are staple products. The former is grown to an immense extent in all the governments which border on the Ural chain, and on both sides of the upper course of the Volga, particularly in the governments of Tver, Yaroslavl, and Kostroma. Flax is also cultivated to a great extent in the same districts, but more especially in the governments of Olonets, Vologda, Livonia, and the southern parts of Finland. Both their fibre and their seed form most important articles of export from the ports of Riga, Saint Petersburg, and Archangel. Kitchen gardens, in many parts, attract considerable attention, and cabbages, turnips, carrots, and onions are occasionally cultivated on an extensive scale; in some of the districts bordering on the southern steppes the watermelon thrives amazingly, attaining immense size with little culture, and, while in season, forms a principal food of the lower classes. In Astrakhan, on the banks of the Volga, licorice grows with a luxuriance unknown elsewhere, and furnishes juice sufficient to form an important article of export. Few fruit trees are found beyond latitude 56° and their regular culture cannot be profitably carried on beyond latitude 53° N. There apples, pears, and plums become tolerably abundant; and farther south peaches, apricots, quinces, almonds, and pomegranates become common fruits. The vine and mulberry also are extensively cultivated, and considerable quantities both of wine and silk are obtained. In the Crimea extensive vineyards have been formed with plants selected with the utmost care, and several of the wines have already acquired a high name. Other governments have imitated the example, and the export of wine promises to become an object of great national importance. Among the principal districts in which the culture of the vine is regarded as an object of primary importance may be mentioned Bessarabia, Kherson, Kiev, Astrakhan, and the Don Cossacks. The last makes large quantities of a wine resembling champagne, which finds a ready sale in Saint Petersburg, Moscow, and many of the larger towns.

Stock-raising.—Horses of various breeds are raised, of which those in the north are generally small, but hardy; those of the central and south provinces large and well adapted for draft; and those of the Cossacks remarkable

for their spirit and endurance of fatigue, and their admirable adaptation for light cavalry. On several of the steppes horses still run wild. Cattle are much used, particularly in the south, for agricultural operations, and exist in such numbers that tallow and hides form very important articles of export. The best breeds are those of the Ukraine, Archangel, Bessarabia, and Grodno. In Livonia a great number of excellent cows are kept for the dairy, and much good cheese is made. The sheep are chiefly of three breeds—the original Russian, which is found in vast numbers in every part of the country, and though generally inferior, and producing a very indifferent wool, has been greatly improved by crossing with the merino and Saxon; the Kirghiz breed, remarkable for large size, a darkish-red color, long, but coarse wool, and more especially for their ponderous tails, from which from 30 pounds to 40 pounds of tallow are obtained, and existing in vast numbers on the steppes of the Volga; and the Circassian breed, not confined to the Caucasian provinces, but widely diffused in the Crimea, and among the Cossacks of the Black Sea and of the Don. The improved breeds of sheep are found especially in the Baltic governments of Livonia, Esthonia, and Kurland, but are rapidly spreading into other quarters. Goats are numerous in the south, where they are valued chiefly for their skins, which are used in making morocco leather. In some districts Angora goats are kept for their fleeces, which are remarkably fine, and manufactured into shawls. In the northern regions, bordering on the Arctic Ocean, large herds of reindeer are kept; and in the south, at the opposite extremity, among the Tartars of the Crimea and the inhabitants of the Caucasus, the camel is often seen.

Commerce.—Russian commerce is now very extensive. The chief trade is with Great Britain and Germany. Above a fifth of the exports go to the former, and the latter supplies about 40 per cent of the imports. The principal exports are timber, oats, flax, and tow, wheat, barley, eggs, and linseed. Raw cotton for manufacture is imported annually to the value of from \$30,000,000 to \$50,000,000. Wool and silk are also imported, as well as coal, machinery, iron, copper, lead, and ships. Besides Great Britain and Germany, a considerable trade is carried on with the United States, France, Austria-Hungary, Sweden and Norway, Egypt, Belgium, Italy, Turkey, and Denmark, as well as with China, Persia, and other eastern countries in tea, silk, etc., in exchange for furs, leather, and fabrics of European manufacture. The values of the general exports and imports (exclusive of specie) of European Russia for five recent years were:

YEARS	Exports	Imports
1896	\$413,180,000	\$351,318,000
1897	435,972,000	316,000,000
1898	439,602,000	370,476,000
1899	376,188,000	390,288,000
1900	429,852,000	375,822,000

Manufactures.—In a country where so much land remains to be taken into cultivation, and population is very much scattered, manufactures cannot be expected to be carried on upon an extensive scale, except in a few leading towns. Considering the unfavorable circumstances the

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progress of Russia in manufactures is much greater than could have been anticipated, and certainly much greater than it could have been had not the government done the utmost to promote it, both by the establishment of large model manufactories and various other modes of encouragement. The branches in which most progress has been made are leather, both ordinary and morocco, the latter particularly at Astrakhan, Torjok in the government of Tver, Kazan, and Taurida, in all of which the article produced is unsurpassed in any other country in Europe; cotton twist and cotton goods at Saint Petersburg, Moscow, and in the governments of Vladimir, Kostroma, and Piotrkov; woolen and linen goods in many parts of Poland, the governments of Kiev, Ekaterinoslav, Moscow, Kaluga, and most of the principal towns; silks, particularly in Saint Petersburg and Moscow; sail-cloth, at these two capitals, and also in the governments of Archangel, Riazan, and Novgorod; fine cashmere shawls, in the governments of Penza and Ekaterinoslav; fine carpets, at Kamenskoi, Smolensk, and Kursk; cordage at Archangel and in the government of Orel; metals, more especially iron and copper, in the government of Perm, and many other localities; firearms and cutlery, in the governments of Tula, Nijni-Novgorod, and Vladimir; swords and edged weapons near Zlato-ust, in the government of Ufa; plate-glass and crystal, at Saint Petersburg, Tula, Tver, and in the Donetz basin; paper, at Moscow, Saint Petersburg, Yaroslavl, Kaluga, and in Livonia; hosiery, at Sarepta and various other places; and oil, candles, soap, glue, tobacco, window glass, glass bottles, etc., in almost every important town. The total number of persons employed in manufactories, mines and other establishments as recently given was about 2,100,000, the yearly production being valued at \$925,000,000.

Shipping and Navigation.—The mercantile marine of Russia on 1 Jan. 1901 consisted of 3,038 vessels with an aggregate of 633,819 tons; this included 745 steamers of 364,360 tons, 715 sailing vessels aggregating 91,270 tons, and 126 steamers of 49,258 tons belonged to the Baltic; 416 sailing vessels of 24,100 tons, and 42 steamers of 8,396 tons belonged to the White Sea; 635 sailing vessels of 42,843 tons and 316 steamers of 186,774 tons belonged to the Black Sea and the Sea of Azov; while 527 sailing vessels of 111,246 tons and 261 steamers of 119,932 tons belonged to the Caspian Sea. In 1901, 1,109 Russian vessels of 727,000 tons aggregate and 3,087 foreign vessels of 3,049,000 tons aggregate, entered the ports of European Russia; and 1,349 Russian vessels aggregating 713,000 tons and 7,441 foreign vessels aggregating 6,823,000 tons cleared the same ports.

Canals and Railways.—Considering the vast extent of country, the seaports are numerous, being Archangel, in the Arctic Ocean; Saint Petersburg, Revel, Helsingfors, Libau, Riga in the Baltic; Odessa, Nicolaiev, Sebastopol, Theodosia, Batoum, Poti, Kertch, Mariopol, and some minor ones in the Black Sea; Taganrog and Rostov in the Sea of Azov; and Astrakhan, Baku, Petrovsk, Derbent, Krasnovodsk, Usun Ada in the Caspian. The great distances at which the seas containing these ports are situated from each other

and from the interior of the country must have confined the foreign trade within very narrow limits had not a remarkable number of internal feeders been provided, partly by nature and partly by art; by nature, in the magnificent streams which wind across the country in all directions, and owing to the general flatness of the surface are well adapted for navigation; and by art, first in the great system of canals by which the different basins to which these rivers belong have been made to communicate with each other, so as to give a continuous navigation from the Arctic Ocean to the Black Sea, and from the Baltic to the Caspian; together with a network of branch canals, by which all the great towns of the interior have ready access to their outports and to each other; and secondly in the system of railways, by which internal commerce will eventually be more thoroughly opened up. The railway system was begun by the Emperor Nicholas, and has been carried out more fully and comprehensively under his successors. Some of the lines are formed directly by the state, others by private companies under guarantees from government. The greatest railway undertaking in the empire is the Trans-Siberian line, now practically completed, from Chelyabinsk to Vladivostok and Port Arthur. The total length of railways open for traffic in the end of 1901 (including Asiatic Russia) was 36,526 miles, of which about 23,400 miles were state railways. European Russia had 27,500 miles of railway. Among the most important lines in operation are that which unites Saint Petersburg and Moscow with Warsaw, and through it with the railway system of Europe; the lines from Moscow to Nijni-Novgorod and Riazan, from Orel to Vitebsk, Voronezh to Rostov on Don, Dunaberg to Vitebsk, Kursk to Kiev and to Kharkov, Kharkov to Azov, and the line from Odessa to the interior.

Moneys, Weights and Measures.—The present currency system of Russia was fixed by laws passed in 1885 and 1897. The unit of account, represented by a silver coin, is the ruble of 100 kopecks, valued at 51.5 cents. There are three gold coins, the imperial (15 rubles and 10 rubles), 7.50 and 5 rubles. Besides the ruble the following are coined in silver: half-ruble or poltinnick (50 kopecks), quarter-ruble, and pieces of 20, 15, 10, and 5 kopecks. The copper coins are 5, 3, 2, 1, ½, and ¼ kopeck. The law of 1897 fixed the currency on a gold basis. The ruble as the fifteenth part of the gold imperial is the unit in all payments and business transactions. The circulation of the silver pieces representing 1, ½, and ¼ ruble is limited by a ukase of 1898 to three rubles per head of the population, and in ordinary transactions these coins are legal tender up to 25 rubles only. Notes of the value of 1, 3, 5, 10, 25, 50, 100 and 500 rubles are issued by the State Bank. By a ukase of 1897 the issue of paper money was restricted. Up to six hundred million rubles, the bank must secure its issue of notes by a gold reserve representing half the issue, and beyond that amount the gold reserve must be equal to the issue, ruble for ruble. Since 1877 the monetary unit of Finland has been the mark, equal to a franc. The coins in-

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S. J. DE WITTE,
EX MINISTER OF FINANCE.

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clude 20-mark and 10-mark gold pieces; 2-mark, 1-mark, $\frac{1}{2}$ -mark, and $\frac{1}{4}$ -mark silver pieces; and three smaller bronze pieces. One mark is equal to 100 penniä (singular, penni). Silver is a legal tender only up to ten marks. The Russian unit of length is the foot, equal to the British foot, and like it divided into 12 inches. Higher units are the arshin, equal to 28 inches; the sajene, equal to seven feet; and the verst, equal to 500 sajenes or 3,500 feet. A dessiatine is equal to 2,400 square sajenes, or nearly 2.7 acres. The standard of capacity for liquids is the shtof, equal to 2.7069 pints or 93.82 cubic inches. A vedro is equal to 10 shtofs. The unit of capacity for dry goods is the chetwert, equal to 5.774835 gallons. The pound, or unit of weight, is slightly greater than nine tenths of a pound avoirdupois. Forty pounds are equal to one pood. In 1886 the metric system of weights and measures was introduced into Finland.

Banking.—The continual fluctuations in the value of the paper ruble, and the troubles therewith, were ended in 1895 by the Ministry of Finance introducing a regular value for the paper currency, and by the law of 29 Aug. 1897, authorizing the issue of paper currency under certain conditions by the State Bank. (See MONEY, WEIGHTS, AND MEASURES.) The Bank of Russia acts in the double capacity of state bank and of a commercial bank, and has 113 branches throughout the empire. On 1 Jan. 1903 its assets were approximately \$907,516,000; its liabilities including a capital and reserve of \$27,500,000, were \$907,776,500. In 1902 there were 5,629 state, municipal, and postal savings banks with 3,935,773 depositors, and deposits amounting approximately to \$361,491,000. There were also 241 municipal banks, 133 societies of mutual credit, 42 banking companies, and 47 mortgage banks, the latter including state banks for mortgage loans to the nobility, and land banks for the purchase of land by the peasants.

Government.—The emperor (the *czar* or *tsar*) is an absolute ruler having entire control of the legislative, executive, and judicial functions of government, and being irresponsible for their exercise. Since the time of Peter I. the czar has been head of the church. The title czar was borne by the emperors until the time of Alexander II., who with his successors prefer to adopt the title of emperor. By a decree of Peter I. in 1722 the sovereign was authorized to elect his successor, without regard to the law of primogeniture. This was altered by Paul I., who in 1797 fixed the succession according to the law of primogeniture, with preference to the male line. Alexander I. recognized the duty of the emperor to govern according to law, and the right of the senate to remonstrate. It is a fundamental law of the realm, established by Peter I., that the sovereign and the royal family must be members of the orthodox Greek Church. By a decree of Alexander I. the issue of any member of the royal family marrying without the consent of the emperor forfeit the right of succession.

The administration is conducted under the control of the private cabinet of the empire by four great councils. The council of the empire, established on its present organization by Alex-

ander I. in 1810, consists of the ministers *ex officio*, the princes of the imperial house, and an unlimited number of members appointed by the emperor. It meets collectively under a president, and is also divided for administrative purposes into four sections, each of which has a separate president. The sections severally superintend the departments of legislation, civil and church administration, finance and industry.

The senate, established by Peter I. in 1711, is the high court of justice of the empire, and controls all the legal tribunals. It is divided into six sections, which administer the affairs of different provinces. All the sections now sit at Saint Petersburg. The senate consists of men of rank, not exclusively of the legal profession. Each section is presided over by a lawyer, who signs its decrees as the representative of the emperor. The minister of justice presides in the meetings of the whole senate. This court has the power to audit public accounts, the patronage of numerous offices, and the right to remonstrate with the emperor.

The Holy Synod, established by Peter I. in 1721, superintends the religious affairs of the empire. It comprises the metropolitans of Saint Petersburg, Moscow, and Kiev (president), the archbishops of Georgia and of Poland, and several bishops sitting in turn.

The committee of ministers is divided into eleven departments, each presided over by a principal minister and member of the council, who are assisted in the departmental work by subordinates. The various ministries are the imperial house, foreign affairs, war, navy, interior, public instruction, finance, justice, agriculture, public works, general control.

There are also imperial cabinets dealing with charitable affairs, public instruction of girls, petitions, and one dealing in sections with economy, mines, manufactures and legislation. Yielding to the popular demand for self-government, Nicholas II., 19 Aug. 1905, issued a manifesto granting a National Duma or Consultative Assembly (Gosoudarstvennaya Duma) of elected representatives from the whole of Russia, to take an active part in the elaboration of laws and discussion of measures for the welfare of the empire. See *History*.

Finance.—The chief sources of revenue are direct taxes, indirect taxes (customs, etc.), posts, telegraphs, mines, spirit monopoly, railways, and forests, and the principal items of expenditure are those represented by administration, public debt, army, navy, pensions, and railways. The total estimated revenue for 1902 was \$973,285,990, of which \$900,392,240 represented ordinary revenue. The total expenditure was made to amount to the same sum, and included \$887,956,740 of ordinary expenditure. The ordinary revenue thus exceeded the ordinary expenditure by about \$12,500,000. The total public debt on 1 Jan. 1901 amounted to \$3,105,280,000, much of it representing railway obligations. The debt charge included in the expenditure of 1902 amounted to \$143,230,000. The revenue and expenditure of Finland in 1901 were balanced at \$21,336,725, and the debt was \$22,289,775 almost all contracted since 1889.

Army.—The Russian army is recruited mainly by conscription, and its organization has been determined by laws passed in 1874, 1876, 1888, and 1893. All able-bodied males are liable

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to military service from the age of 21 completed to the age of 43 completed, with the exception of doctors and teachers (in time of peace) and of the Christian clergy. The period of service comprises 18 years in the active army, of which four (five for the cavalry, horse-artillery, engineers, and some others) are passed with the colors, the rest in the reserve, while during the remaining four years required to complete his forty-third year the soldier belongs to the first section of the territorial army, which includes also those not drawn for active service during the whole 22 years of their liability. The second section of the territorial army includes all those drawn for service but not incorporated, for some reason, in the permanent army. The Cossack army is organized differently, and liability to service begins on the completion of the 18th year. The period of service is diminished in the case of those who possess certain educational qualifications. There are 25 army corps, namely, the guards (Saint Petersburg), the grenadiers (Moscow), 21 territorial corps having their respective headquarters at Saint Petersburg, Grodno, Vilna, Minsk, Warsaw (3), Simferopol, Odessa, Kiev (2), Kharkov, Kovno, Vinniza, Smolensk, Lublin, Vitebsk, Moscow, Dorpat, Brest-Litovski, and Riga, and the first and second corps of the Caucasus, with headquarters at Alexandropol and Tiflis respectively. Most of these corps are formed of two divisions of infantry, two brigades of field-artillery, one division of cavalry, and one section (two battalions) of horse-artillery, but the guards and the grenadiers have three divisions of infantry and three brigades of artillery, and the guards corps has two cavalry divisions and one brigade of horse-artillery, while the numbered corps also present some irregularities. There are also two cavalry corps, with two divisions each, having their headquarters at Warsaw. The total strength of the European army organized in the corps formations is therefore 52 divisions of infantry, 22 divisions and two brigades of cavalry, 52 brigades of field-artillery, and one brigade of horse-artillery. In time of war an army corps consists of two infantry divisions (each 18,000 men) and one cavalry division (4,000 men), comprising altogether 40,000 men. Each infantry division in war includes cavalry, artillery, etc., and each cavalry division includes artillery. The strength of a battalion is about 500 in peace and about 1,000 in war. The following table shows the approximate effective war strength of the Russian army in 1900:—

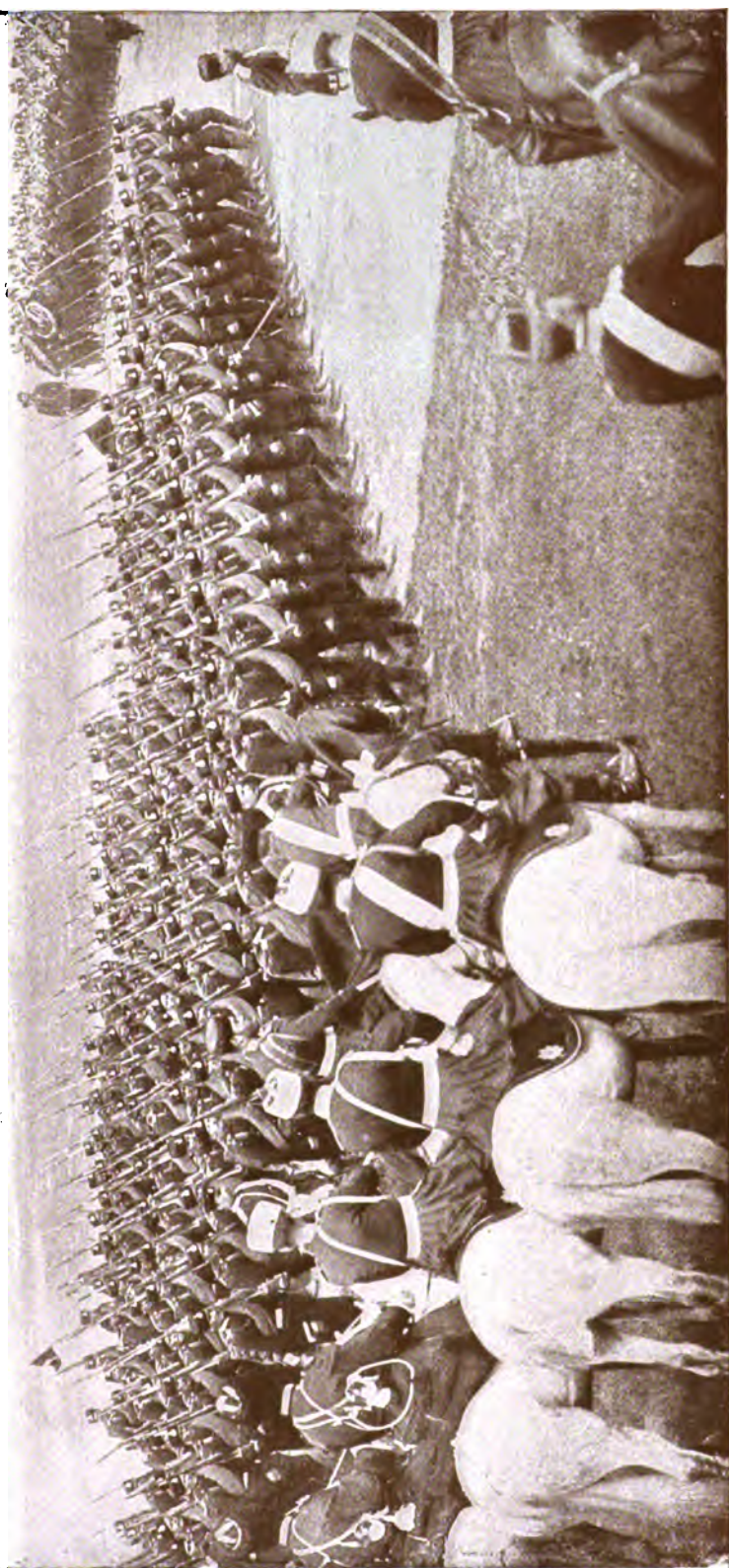
	Infantry	Cavalry	Artillery	Engineers	Train
Field Troops...	1,019,500	123,800	128,500	47,100	26,400
Reserve Troops...	691,500	99,300	46,670	10,300	.....
Fortress Troops...	162,600	.....	81,500	12,400	.....
Reinforcements...	285,000	48,900	38,600	7,840	.....
National Defense	695,600	22,350	28,450	4,100	.....
Others.....	41,000	.....	.....	.....	.....
Total.....	2,895,200	294,350	317,720	81,740	26,400

The grand total of all arms is 3,615,410, of whom 66,410 are officers. The fortresses of Russia are Alexandropol, Batum, Brest-Litovski, Cronstadt, Dvinsk, Dünamunde, Ivangorod, Kars, Kertch, Kiev, Kovno, Libau, Novogeorgievsk, Odessa, Ossovietz, Ochakov, Poti, Saint Peters-

burg, Segri, Sevastopol, Sveaborg, Warsaw, Vladivostok, and Viborg.

Navy.—In 1901 the strength of the Russian navy was as follows, vessels in course of construction being included:— Battleships, 24 (7 first-class, 15 second, 2 third); coast-defense vessels, 9 (4 modern); armored cruisers, 3; first-class cruisers, 2; other cruisers (protected or belted), 16; torpedo gunboats, etc., 9; destroyers, 30; first-class torpedo boats, 43; other torpedo boats, 150; submarines, 1; and steam-yachts, training-ships, etc. The total personnel of the Russian navy is about 46,000.

Ethnology.—Ethnologically the peoples of Russia are comprised under two of the great divisions of the human race—the Caucasian and the Mongolian; but under each a considerable number of varieties are traced. The Mongolian stock in European Russia is represented by the Finns and their allies, and by the Kalmucks, who occupy some of the southeastern steppes, but have lost many of their distinctive features by intermarriage with Caucasians. Of the Caucasian stock the Slavonians, under the names of Russians, Poles, Lithuanians and Letts, Wallachians and Servians, form about nine tenths. Of these again, the Russians proper form the great body of the population, and are estimated at about 50,000,000. They occupy, with little intermixture, the central provinces between the Dnieper and Volga; form a vast majority in the north, between the Ural Mountains and the White Sea, and, in the south, between the Don and the Dniester; and are found, more or less intermingled with other varieties, in all other parts of the country. The Poles are found in the greatest number in their own country. In that part of it which in the dismemberment fell to the share of Russia they amount to about 9,000,000. The Lithuanians are found chiefly in northern Poland, and in the governments of Vilna and Minsk. They are estimated at about 1,500,000. Still farther north are the Letts, or as they are often called, the Kurs, from living chiefly in Courland. They are also the chief occupants of Livonia, are wholly devoted to agricultural pursuits, and may amount to 500,000. The Wallachians, and among them a few Servians, are found only in Bessarabia, between the Dniester and Pruth. Their language is a descendant of Latin mixed with foreign words. They, too, do not exceed 500,000. The Tchudes, or Finns, though they belong to the Mongolian race, have little or none of the characteristic Mongolian type of countenance. They are of middle size, fair complexion, and generally have light hair and blue eyes. They are settled on both sides of the Gulf of Finland, but on the north of the gulf form the two marked divisions of Finns proper and Laplanders, the former living south and the latter north of lat. 65°. To the south of the gulf the Finns occupy the far greater part of Esthonia and a small part of Livonia. Widely separated from the western Finns, though the mode of separation is not known, a great number of Tchudic or Finnish tribes are found occupying the western slopes of the Ural Mountains and the banks of the Middle Volga under the names of Syrianes, Permians, Voguls, Votiaks, Tchuvasses, Tchermisises, Mordwins, and Teptiaries. The most numerous are the Tchuvasses and Tchermisises, who live together on both sides of the Volga,



THE CZAR REVIEWING A RUSSIAN REGIMENT.

RUSSIA.

in the neighborhood of Kazan, and are estimated at about 500,000. All the others do not exceed the same number. The second great branch of Mongolians inhabiting Russia are the Tartars, who here form four distinct tribes—the Tartars of Kazan, in some respects the most civilized nation in Russia, though the great majority of them still cling to Mohammedanism, and numbering about 230,000; the Bashkirs, occupying both sides of the Ural Mountains from lat. 56° to 54° N., still given to wandering life, and amounting to about 130,000; the Nogais, occupying a large part of the Crimea and the steppe to the north of it, dispersed over the country east of the Sea of Azov and the northern base of the Caucasus, and amounting in all to about 600,000; the Metcheriaks, forming a few small tribes, not exceeding 20,000 persons, live among the Bashkirs. The German or Teutonic race inhabiting Russia consist chiefly of Germans and Swedes, intermixed with a few Danes. The Germans are dispersed over the Baltic provinces south of the Gulf of Finland, among the Letts and Esthonians, where they constitute the greater part of the nobility. They are also numerous in Saint Petersburg, Moscow, and other mercantile towns and seaports, and a considerable number of German colonists are settled in the government of Saratov and other parts of the Middle Volga. The Swedes are numerous both along the eastern shores of the Gulf of Bothnia and the northern shores of the Gulf of Finland. Their number in these localities, and more particularly in Esthonia, is supposed to exceed 100,000. The Greeks, dispersed over all the southern provinces as merchants, and in the Crimea, where they are the sole occupants of several villages, are estimated at about 500,000. There are also the Jews, who are seldom found in the central and northern provinces, but are very numerous in ancient Poland, particularly in the governments of Vilna, Grodno, Volhynia, and Podolsk, where they form the far greater part of the urban population. Their number is supposed to exceed 2,900,000.

Population.—As given in the table of the official divisions of the empire, the total population according to the census of 1897 was 129,004,514; of which 106,264,136 were resident in European Russia. The average proportion of women to men is 99.8 women to 100 men, although in the Russian provinces and Finland it is respectively 102.8 and 102.2 women to 100 men. The natural annual increase is over 1,700,000.

Education.—About \$20,000,000 per annum are expended by the State on education. Including secondary and primary schools, the number of educational establishments maintained wholly or in part by government amounts, so far as can be ascertained, to about 50,000, the pupils numbering about 2,500,000. The country is divided into educational districts, but the organization of the means of education is as yet little more than adequate for the education of public officials, and the great mass of the population is wholly uneducated. There are universities at Moscow, Saint Petersburg, Kiev, Kharkov, Yuryev, or Dorpat, Warsaw, Kazan, Odessa, and Tomsk. In Finland, which has a separate system, education is nearly universal, and there is a university at Helsingfors.

Religion.—The established religion of Russia is that of the Eastern or Greek Church. (See GREEK CHURCH.) The Russian Church is established independently under the emperor as supreme and the Metropolitan of Novgorod as ecclesiastical head. It maintains friendly communion with the patriarchates of Constantinople, Jerusalem, Antioch, and Alexandria, and recognizes the authority of the joint patriarchate and of the councils of the whole Eastern Church in matters of doctrine. Religious toleration cannot be said to prevail in Russia, except in favor of foreigners. The members of the orthodox church are not allowed to change their creed. There are, however, considerable sects of schismatic Greek Churchmen. The Greek Church, all sects included, is estimated to number in European Russia 75,000,000; the Roman Catholics, 8,300,000; Protestants, 2,950,000; Jews, 3,000,000; Mohammedans, 2,600,000.

Judiciary and Local Government.—Various parts of the empire are governed by different codes, the laws and institutions of Finland and Poland being partly respected, the former having a quasi-independent form of government. The provinces are under general governors, who exercise a general control of the administration in the name of the emperor. Zemstvos or district and provincial assemblies since 1866 administer the economic affairs of their respective districts, and to them are due much of the reform inaugurated since that date. The country is subdivided into *mirs* or communes, which have the free administration of local affairs. Finland has nominally preserved its ancient constitution with a national parliament of four estates, but is really governed by a governor-general and senate appointed by the emperor. Poland was finally incorporated with Russia in 1868. A voluminous code, called the *Svod Zakonow* or *Corpus Juris*, has been drawn up for the empire, and declared to contain the law of Russia in so far as not modified by the laws and privileges of particular provinces. It contains an abstract of all the laws and ordinances issued by the different emperors from 1649 downward, and forms 15 large volumes. The laws and ordinances in full, but reaching only to 1832, are contained in 56 volumes; of this immense collection eight volumes belong to the first seven years of the reign of the Emperor Nicholas I.

Language.—The Russian is by far the most important of the Slavic languages and it stands in close connection with the other branches of that family. Its underlying element is Slavonic, but there are additions from Mongol, German, and French sources as well as from the ancient classic languages. It may be divided into two dialects, the Great Russian and the Little Russian, the first being the vernacular in the east and centre of the empire, the second in the Ukraine. The Russian is a highly inflected language, possessing seven cases, and a large number of modal modifications for the verb. It is especially rich in augmentatives and diminutives, which, upward or down, may be carried through several degrees of intensity. A still more copious source of word formation is the susceptibility of the roots to manifold development, so that according to Shishkof as many as 2,000 derivatives are often formed from a single root. Great freedom of construction is rendered pos-

sible by the free use of inflections. The standard dictionaries are Dahl, 'Dictionary of the Russian Language'; and the 'Dictionary of the Church Slavonic and Russian Languages' (1847), a new edition of which is now in the course of publication under the direction of the Imperial Academy of Science. The most important work on the grammar of the language is that of Bousslayeff (1881). In English there are: Alexandroff, 'Complete Russian-English and English-Russian Dictionary' (1897-9), and 'A Practical Method of the Russian Language' (1892); Riola, 'How to Learn Russian'; Motti, 'Russian Conversation Grammar.'

History.—The foundation of the Russian empire is assigned by the earliest chroniclers to Rurik (q.v.), a Scandinavian chief, who about the year 860 established himself in the city of Novgorod, summoned thither by the Slav inhabitants to bring peace to a country distracted by civil strife. A part of the Varangians, as the Northmen were known to the Slavs, advanced south and established themselves in Kiev. Rurik was succeeded in 879 by his infant son Igor, but the government was in the hands of his kinsman Oleg, who extended the Varangian power to the west and south and in 882 made himself master of Kiev, leading thence a victorious expedition against Constantinople. Igor (912-945) made an unsuccessful expedition against the Byzantines and fell in battle against one of the rebellious Russian tribes, being succeeded by his son Sviatoslaff (945-972). During half of his reign he remained under the tutelage of his mother Olga, who about 950 embraced the Christian faith. Sviatoslaff waged successful war against the Bulgarians, but met with defeat at the hands of the Byzantines and perished during a revolt of the Petchenegans. The empire was divided among his three sons, with resulting confusion, till unity was restored by Vladimir the Great or the Saint (980-1015), who, an ardent pagan in his early life, embraced Christianity about 988 on receiving in marriage Anna, sister of the Byzantine emperors, Basil II. and Constantine. Soon the nation followed the example of its ruler, who was zealous in the extension of the new faith, Kiev became the seat of a metropolitan, and Russia, in adopting the Greek confession, definitely submitted to the influence of the Byzantine civilization. Vladimir left a realm extending from the northern lakes to the Dnieper and from the Vistula to the Volga, for his eight sons to quarrel over. One of them, Sviatopolk, ruled in Kiev till 1019, but was overthrown by his brother Yaroslaff, whose power after 1034 was undisputed. Under him the process of assimilation between Varangians and Slavs attained fair completeness and we have the beginning of the modern Russian people. Yaroslav divided his dominions among his five sons who ruled at Kiev, Vladimir, Smolensk, Tchernigov, and Peryeslavl, with the ruler of the first as over-lord. This arrangement lasted but a short time and there followed 50 years of confusion, in the course of which the empire was torn up into numerous principalities whose strife prepared the way for a foreign conqueror. Noteworthy among the grand-princes of Kiev of this period are Sviatopolk (1093-1113), who waged long wars against the Polovtser, and Vladimir

Monomachus (1113-25), who did much to improve the condition of the peasantry. Of the Russian principalities which arose about this time the most important were Kiev, which exercised an indefinite overlordship over the other states; Novgorod, extending from the southern Dvina and the upper Volga to the White Sea; Polotsk to the southwest of Novgorod; Smolensk to the south of Polotsk; Volhynia and Halicz in the west; Tchernigov between the Dnieper and the Oka; and Susdal on the upper and central Volga. Of these Novgorod (q.v.) was the most powerful under a government which was essentially republican. It was also the richest of the Russian cities and an influential member of the Hanseatic League. In 1222 the storm of Mongol invasion broke upon Russia and in the following year the princes of Kiev, Halicz, and Tchernigov were defeated in a great battle on the Kalka. The full force of invasion, however, did not come till 1237, when Batui-Khan (q.v.) with an immense army entered Russia, took Ryazan, Vladimir, and Moscow, and overthrew the army of the Prince of Vladimir on the river Siti in 1238. By 1240 all Russia with the exception of Novgorod had been reduced and in 1242 it was placed under the authority of the Golden Horde or Khanate of Kiptchak, whose rulers made and unmade princes at their will, though no attempt was made to intervene in the internal affairs of the various principalities. The country, which had suffered fearful devastation during the conquest, was now ground down by heavy impositions of tribute, and all attempts at throwing off the foreign yoke met with bloody retribution. Novgorod, the last of the Russian principalities to submit, fell toward the end of the 13th century. The effect of the Mongol conquest on the state of civilization in Russia was deplorable and may be said to have rendered that great empire what it still remains, the most backward country of Europe, after Turkey.

Kiev and Tchernigov had been destroyed during the wars of Batui-Khan and the centre of power now shifts to the north where Vladimir for a time was the most important of the Russian principalities; the most noted of its rulers was Alexander Nevski (1252-63), who won notable victories over the Swedes and the Livonian Sword Bearers. The succeeding period witnessed Russia's deepest degradation brought about by internal strife among the princes whose dissensions served only to fix the Mongol yoke more firmly on the people. Vladimir in the course of time yielded precedence to Tver and Moscow, between which a long contest ensued for supremacy, ending in the triumph of the latter, whose period of ascendancy begins with the Grand Prince Ivan Kalita in 1328. Ivan beautified Moscow, built the Kremlin, and by winning the favor of the Khans retained the succession in his family. His son Simeon the Proud (1340-53) extended the power of Moscow, and Simeon's grandson Dmitri (1362-83) thought himself strong enough to rise against the Mongols, over whom he gained a splendid victory on the Don in 1380, acquiring thereby the surname Donakoi. Moscow, however, was taken and burned and Dmitri was forced to renew his allegiance to the Khan. His son Vassili II. (1389-1425) raised the power of



NICHOLAS II, CZAR OF RUSSIA.

Moscow to a higher point than ever and under his successor Vassili III. (1425-62) great increases in territory were made by the annexation of neighboring principalities in spite of long years of civil confusion. The power of Moscow was still further increased by the disruption of the Khanate of Kiptchak into a number of independent hordes, or khanates, among which the Khanate of Kazan was brought under the authority of Moscow by Ivan III. the Great (1462-1505), who in 1478 reduced Novgorod and in 1480 helped to overthrow the Khan of the Golden Horde, whereby Russia was freed from the Mongol yoke. In 1472 Ivan married Sophia, niece of the last Byzantine emperor, and, pretending to imperial honors, assumed the title of Grand-Prince and Autocrat of Russia. He made an attempt to introduce western civilization into Russia but proved less successful as a reformer than as a warrior. At his death he left a realm increased nearly fourfold by conquest in the east, the south, and the west. His son Vassili III. (1505-33) furthered the introduction of the European arts. He left an infant son Ivan IV. (1533-84), who grew up in the unfavorable atmosphere of a dissolute court and assumed personal power in 1547 at the age of 17, first making use of the title Czar. Ivan overthrew the Khanates of Kazan and Astrakhan and waged repeated wars with the Tartars of the Crimea, who in 1571 raided and burned Moscow and carried off an immense number of prisoners. He attempted to gain an outlet for Russia on the Baltic but failed against the hostility of Sweden and Poland. The establishment of commercial intercourse with England by way of the White Sea led to the coming of large numbers of western artists and mechanics who were welcomed by Ivan. In his reign, too, began the conquest of Siberia (q.v.) by the Cossack Yermak. Within the realm Ivan devoted himself to crushing out the privileges of the Boyars or nobility and to render his will absolute in every field. He succeeded in attaining his end by acts of the most fearful cruelty which earned for him the name of the Terrible. Novgorod, which attempted to make common cause with Poland, was stormed and subjected to massacre and plunder for five weeks, in the course of which 60,000 of the inhabitants are said to have perished. Ivan IV. was succeeded by the weak Feodor I. (1584-98), who left the affairs of government to his brother-in-law Boris Godunoff. The latter, aiming at the throne, brought about the death of Feodor's younger brother Dmitri, and on the death of the Czar (the last Rurik) was elected to succeed him. His rule (1598-1605) was unpopular and widespread dissatisfaction provided the opportunity for the appearance of a number of pretenders claiming to be the murdered Dmitri. The first of these, with the aid of the Polish king, overthrew Boris in 1604 and on the latter's death in the following year, was crowned at Moscow. He was dethroned and killed in the following year and Vassili Shiuski was chosen to the throne. A new pretender now appeared, Vassili was forced to abdicate, a faction of the Boyars chose Ladislav, crown prince of Poland, for their ruler, and a Polish army took possession of Moscow. There followed two years of anarchy till a national uprising headed by Minin and Pozharsky drove the Poles from the capital (1612), where-

upon Michael, Romanoff, a youth of 17, was chosen to the throne by a representative assembly (1613).

The new Czar, who during the first part of his reign was under the influence of his father, the patriarch Feodor Philarete, devoted his energies to restoring order to the distracted country and concluded peace with Sweden and Poland at the cost of much Russian territory. Michael died in 1645 and was succeeded by his son Alexei Mikhailovitch (1645-76), under whom a popular revolt occasioned by the misgovernment of certain court favorites led to a thorough reform of the laws and the administration of justice, effected by the enactment of a new code, the *Uloshenie*. In the war between Sweden and Poland, which broke out in 1653, Russia, as the ally in turn of either party, met with final defeat at the hands of Sweden. From Poland, however, it obtained by the treaty of Andrussov in 1669, Little Russia east of the Dnieper, Kiev, and Smolensk. The changes effected at this time by Nekol, the patriarch of Moscow, in the dogma and ritual of the Church, though accepted by the majority of the nation, created the sect of Old Believers or Raskolniki (q.v.), who carried their hatred of innovation into the secular field and sought to combat the introduction of western civilization into the country. Alexei was succeeded by his eldest son Feodor Alexeievitch (1676-82), who continued the reform policy of his father by abolishing the old nobility of office and creating a new aristocracy in its place. Upon Feodor's death without issue, his half-brother Peter, a child of 10, was chosen Czar in accordance with the dead monarch's will. Ivan, a full brother of Feodor and a youth of 16, was passed over because of his mental infirmities. A revolt in his favor, however, led to the acknowledgment of both brothers as co-rulers under the regency of Ivan's sister Sophia, a woman of great ambition and power of will, who entered into an unsuccessful war with Turkey, repressed a rising of the Old Russian party, and the Raskolniki and, when Peter, with advancing years, began to assert his authority, plotted to bring about his death with the aid of the Streltsi, the body of royal troops first organized by Ivan the Terrible. Peter escaped from the power of the Regent and in the brief struggle which followed, Sophia was overthrown, the Streltsi were severely punished, and as Peter I. (1689-1725) the founder of Russia's greatness as a European power began his reign. Ivan retained the title of Czar till his death but exerted no influence in the government. Given in detail under his own name, Peter's services to his nation may here be closely summarized. Externally he made it his life's task to gain for Russia an outlet on the western and southern seas, the only seaport in the empire at that time being Archangel on the ice-covered White Sea in the north. The conquest of the Black Sea coast land began with the capture of Azov in 1696. A short period of peace during which the young Czar repressed a formidable uprising of the Streltsi, destroyed that famous corps and organized an army on the western model, was followed by Russia's entrance into the northern war as the ally of Poland against Sweden. Peter's army was badly beaten by Charles XII. at Narva, in 1700, but the Czar profited by ill-success, reorganized his forces, and at Pultova in 1700 over-

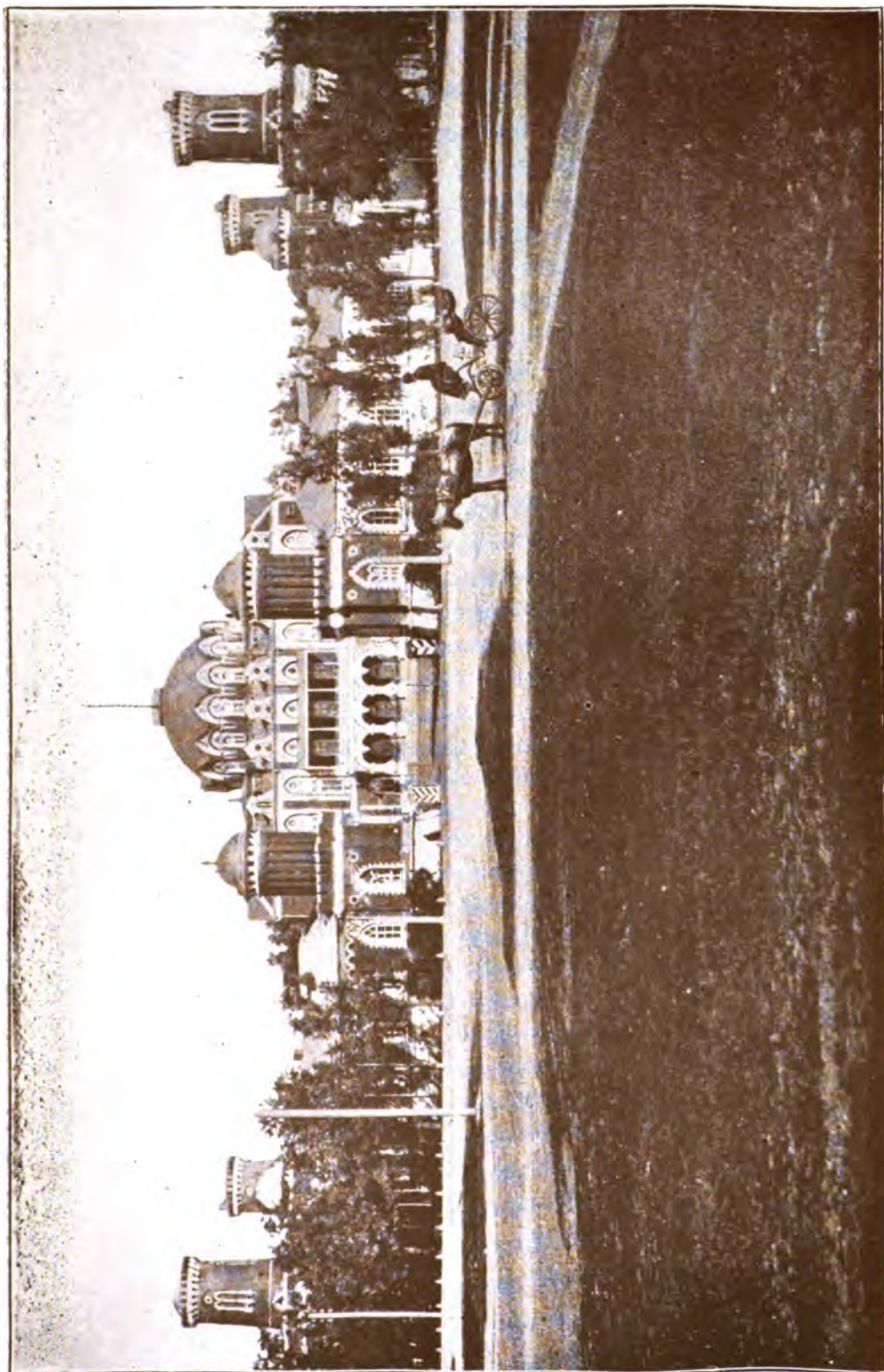
threw Charles, who was forced to seek refuge with the Sultan. The latter was incited to war against Russia, and in 1711 Peter, caught with his army in a trap on the Pruth River, was forced to purchase peace by the surrender of Azov. In the north, however, the Russian fortunes had prospered. Shortly after Narva Peter had made himself master of parts of Esthonia, Livonia, and Ingria, and in 1703 had laid the foundation of his new capital, Saint Petersburg, on the banks of the Neva, in territory conquered from the Swedes. By the treaty of Nystadt, in 1721, Russia was confirmed in possession of these Baltic lands, and secured in addition parts of Carelia and Finland, succeeding thus to Sweden as the leading power in the north of Europe. A three years' war with Persia during the last part of Peter's reign resulted in the conquest of a portion of the southern coastland of the Caspian Sea. Internally Peter's efforts were directed to the introduction of western civilization into his dominions and to a very great degree he was successful. The industries, schools, and arts of western Europe were brought in and forced by the Czar upon an unwilling people for their good. Far less successful was his attempt to engraft western refinement and habits of thought on a nation whose ideals were half patriarchal and half Oriental. The anomalies of the Russian character, which at the present day present so much that is puzzling to the western mind, may be traced to this artificial amalgamation process pursued by Peter the Great. To enforce his will, the Czar must of needs be absolute within his dominions and Peter carried the centralization of power to the extent of abolishing the patriarchate and vesting the ultimate control of the Church in his own person.

Peter's only son Alexei had died during his father's lifetime, and the crown passed to the wife of the dead monarch, Catharine I., who was succeeded in 1727 by Peter II., a son of Alexei. On Peter's death in 1730, the Privy Council, in which the influence of the families of Galizyn and Dolgorouki was predominant, called to the throne Anna Ivanovna (1730-40), Duchess of Courland and a daughter of Peter the Great's half-witted brother Ivan. Defeating an attempt of the aristocracy to limit her powers, she left the affairs of government to her favorite Biron, a native of Courland, who soon aroused the hatred of the Russian party. A war with Turkey in 1735-9 resulted in the permanent acquisition of Azov, but at the same time Peter's conquests in Persia were abandoned. Anna Ivanovna died in 1740, leaving the throne to her infant grand-nephew Ivan (1740-1) under the regency of Biron. The latter, however, was speedily overthrown and Anna Leopoldovna, mother of the young Czar, became Regent with Marshal Münnich (q.v.) as her chief adviser. A conspiracy headed by the French ambassador at Saint Petersburg brought about, in the same year, the fall of Anna Leopoldovna and the entire German faction, and the elevation to the throne of Elizabeth (1741-62), the daughter of Peter the Great. Under the influence of England, Russia entered the war of the Austrian Succession as an ally of Austria and in the Seven Years' war, Elizabeth's hatred for Frederick the Great made her a bitter opponent of Prussia. The Russian armies gained victories over Frederick's generals at Gross jagersdorf

(1758), and Kunersdorf (1759), raided Berlin in the following year, and overran East Prussia. This reign is noted for the progress made in the spread of education and general culture. The University of Moscow, the first in Russia, was founded in 1755. Elizabeth was succeeded by Duke Peter of Holstein-Gottorp, a son of Peter the Great's second daughter Anna, who in less than a year fell a victim to a conspiracy of which his wife, Catharine, was the leading spirit. After Peter's death by violence, Catharine, the second of that name, ascended the throne, one of the most dissolute women of her time and one of the greatest rulers of all times. During her long reign (1762-96) Catharine II. labored incessantly for the internal development of the empire. Commerce and industry were encouraged, education was furthered, the laws and the systems of administration were reformed. Abroad the power of Russia was tremendously enhanced at the expense of Poland and Turkey. In the dismemberment of the former (see POLAND) Catharine was the leading spirit and by the threefold partition of that country, enormous territorial gains were made. In the first war with Turkey (1768-74) Russia acquired the land between the Dnieper and the Bug and the right of free navigation on the Black Sea. The Sultan renounced his overlordship over the Crimea, which soon after fell to Russia. In a second war (1787-92) Russia acquired the land between the Bug and the Dniester. Courland was annexed in 1795 on the death of its last duke. Catharine II. was succeeded by her son Paul I. (1796-1801), whose tyrannous acts, proceeding rather from a gloomy suspiciousness of character than from innate cruelty, aroused general dissatisfaction. He was assassinated by a number of the highest dignitaries of the court and the crown passed to his son Alexander, who had been a party to the projected dethronement of his father, though possibly not to his murder.

Alexander I. (1801-25) devoted the first year of his reign to carrying into effect the lofty ideals of government implanted in him by his tutor La Harpe (q.v.). Reforms in administration and the laws were enacted, the finances were partially reorganized, education was encouraged, and the condition of the serfs ameliorated in part. In the Baltic provinces villeinage was abolished. Soon, however, the Czar found himself drawn into the vortex of the Napoleonic wars. Paul I. had entered the struggle against the French Republic and the victories of the Russians under Suvaroff in northern Italy (1799) had driven the French from that region. Later Paul had withdrawn from the coalition and with Sweden, Prussia, and Denmark had formed the armed neutrality of the North aimed against the pretensions of Great Britain. Alexander I., on his accession, had made peace with England and now, in 1805, he joined the third coalition against France. The Russians shared in the disastrous defeat at Austerlitz, and in 1807, as an ally of Prussia, suffered a crushing defeat at Friedland (q.v.). In the peace of Tilsit Alexander I. and Napoleon came to terms whereby the former, in return for abstaining from intervention in the affairs of western Europe, was permitted to work his will on Sweden and Turkey. Finland was wrested from Sweden. Turkey after a six-years' war (1806-12) was forced to cede the lands east of the Pruth.

RUSSIA.

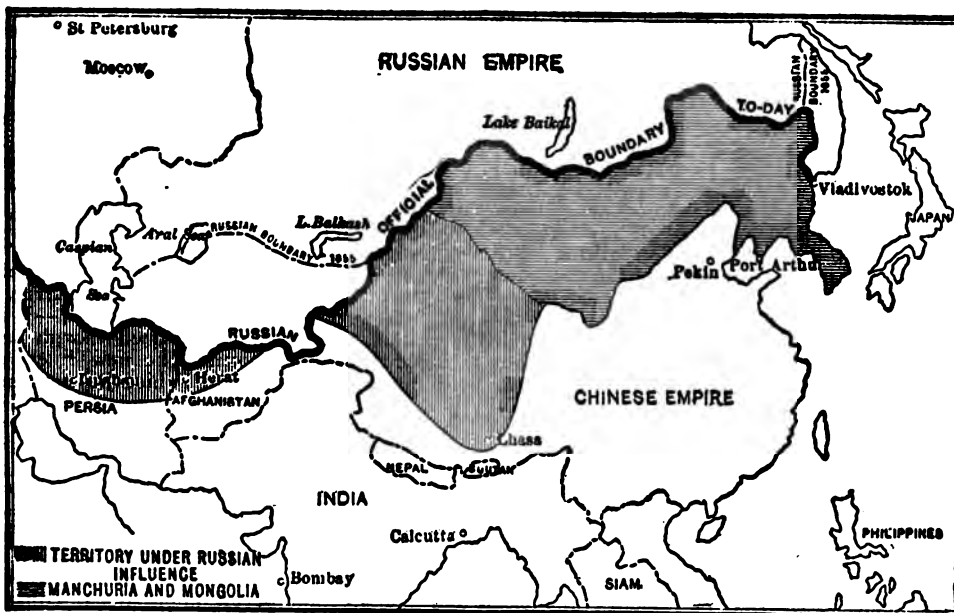


THE PETROWSKI PALACE, MOSCOW.

RUSSIA

From Persia the Caspian coastland around Baku was acquired. The failure of Alexander I. to lend support to Napoleon's continental system brought on war between the two in 1812. There followed the invasion of Russia by the Grand Army of France, the disastrous campaign, and the pitiful retreat with its ultimate outcome in the total overthrow of the great emperor. (See NAPOLEON I.) In the rising of Europe against Napoleon in 1813 Alexander assumed the leadership. The Russian armies took a very important part in the final campaigns of 1813-14, and the terms of peace with France, the restoration of the Bourbons, and the rearrangement of the political system of Europe at the Congress of Vienna were largely the work of the Czar and of Metternich. The Congress of Vienna created the kingdom of Poland, which it bestowed on Alexander I. The Czar until his death was the most powerful monarch of Europe, whose destinies he controlled in considerable measure

of Nicholas I. was one of ruthless repression and intellectual gloom; Nicholas was an autocrat whose will was law and whose instruments were the army and the police. Abroad Russia's position was of the highest, until the very close of the reign. War with Persia (1826-8) resulted in the conquest of part of Armenia. War with Turkey (1827-9) brought about the acquisition of another portion of Armenia, and established the independence of Greece and the autonomy of the Danubian principalities. The national consciousness was stirred by the revolution of the Poles in 1830, the ancient enemies of Russia. The insurrection was suppressed with great severity and Poland was incorporated with Russia. (See POLAND.) In 1833 Nicholas I. came to the aid of the Sultan against Mehemet Ali and in 1848-9 the Russian armies aided the Austrian forces in suppressing the Hungarian revolution. In 1853 Nicholas, assuming the role of protector of the Orthodox Christians in Turkey, declared



Map showing Russian advances in Asia during the last fifty years.

through the Holy Alliance (q.v.). At home, the fair promise with which his reign had begun came to naught and the desire for a thorough reform of the state, stimulated by contact with the ideas of the French Revolution, remained unsatisfied.

Upon the death of Alexander I. without issue it became known that his brother Constantine, the next in the order of succession, had renounced his rights to the crown. Nicholas, the youngest brother of the dead monarch, refused to accept the crown until it became evident that Constantine was determined not to succeed. The uncertain condition of affairs was seized upon by a large number of officers as an opportunity for rising in arms with the purpose of liberalizing the state system. This revolution of the Decembrists, as the rebels were known, was repressed with energy by the new monarch, many of the leaders were executed and large numbers exiled to Siberia. Internally the reign

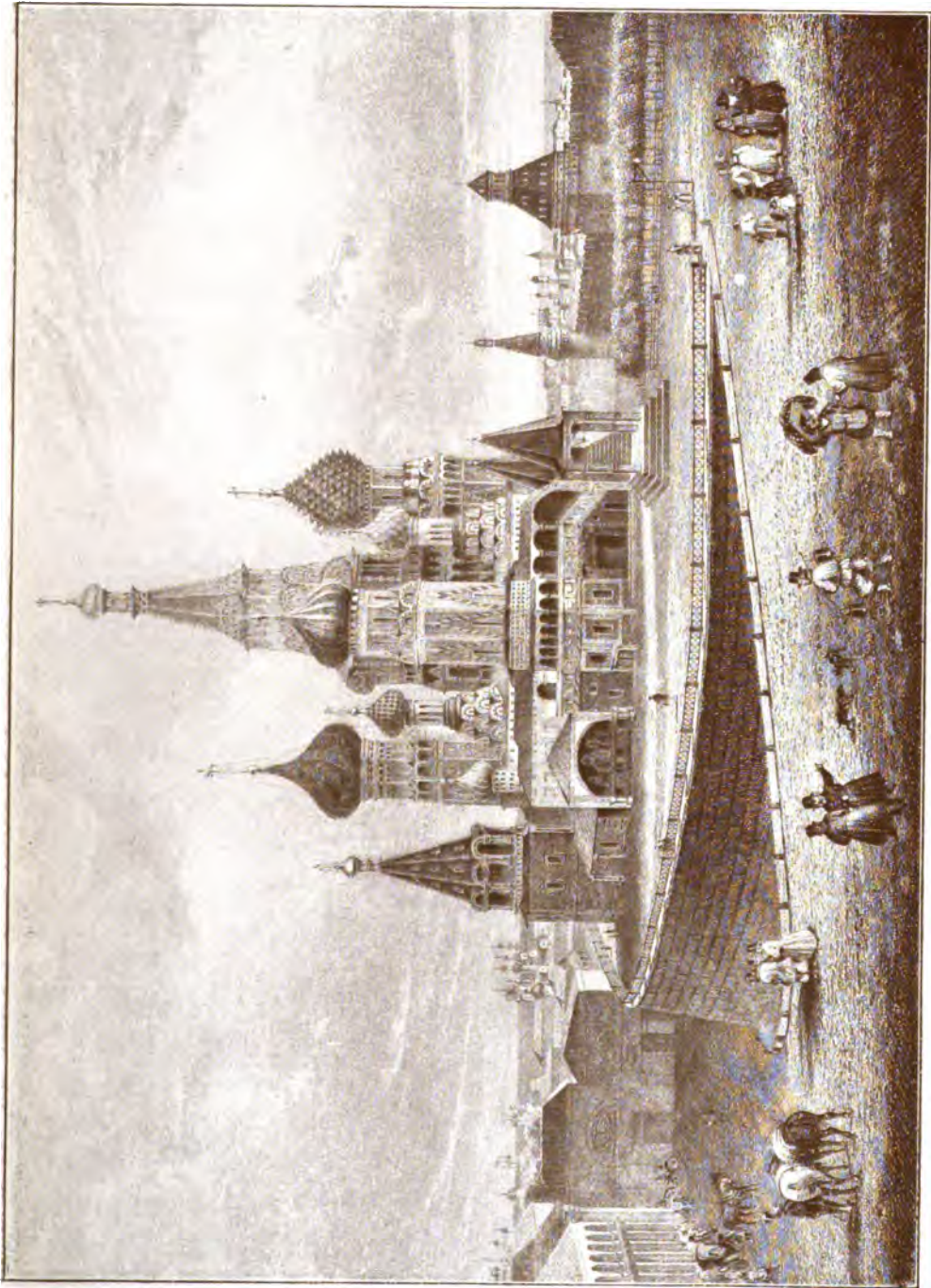
war against the Sultan, who was joined by England and France, alarmed at the growing influence of the Russian monarch. The Crimean war (q.v.) which followed destroyed the Russian ascendancy in Europe. Internally financial disorder and industrial depression did much to discredit the absolutist system under which the country had been ground down for 30 years. The demand for thorough reform became general and received answer early in the reign of Alexander II. (1855-81), who succeeded his father in the midst of the Crimean war. The series of reforms began with a reduction in taxation and the size of the standing army, the building of railways was begun, the censorship was relaxed and an influential press created; measures for the spread of education were taken. On 19 Feb. 1861 the emancipation of the serfs was decreed after three years of preliminary investigation. About 23,000,000 serfs thus obtained their freedom and with the aid of govern-

ment loans were set on the way toward acquiring ultimate possession of the lands they cultivated. Naturally the act of emancipation was not unaccompanied by disorder and dissatisfaction consequent on the sudden change from servitude to the responsibilities of freedom on the part of the peasants and in a number of ways the results were not so beneficent as had been expected; yet the liberation of the serfs was a great step forward in the development of the Russian people. It was followed by judicial reforms comprising the establishment of jury courts and by the institution of district and provincial assemblies which were intended to prepare the way for a national parliament on which all hopes of a thorough reform in the state were based. In 1863 the Poles rose in insurrection and though the uprising assumed no very formidable proportions, the strength of Russia was tried in its suppression. Like the uprising of 1831 the Polish insurrection of 1863 was followed by a great awakening of the Russian national consciousness, which took the form of a demand for the development of Russia not on western lines but in accordance with its own ethnic genius. This outburst of patriotism threw the reform movement in the background and the problems of emancipation failed to receive sufficient attention from the bureaucracy with consequent dissatisfaction among considerable classes of the population. The Nihilists (q.v.) began to agitate ideals of radical individualism and the reorganization of the state, and when the government sought to repress their activity a faction among them resorted to terrorism to bring about constitutional reforms. In 1878 began a series of personal assaults on high officials of state which led to correspondingly severe measures on the part of the government. Military rule became general in the empire and the secret police hunted down the leaders of the Nihilists who were punished with death or exile. Yet Alexander II., under the guidance of Loris-Melikoff (q.v.), was planning to meet the demands of the Liberals by summoning a national assembly, when he fell a victim to the anger of the Nihilists, 13 March 1881. The progress of the Russian arms during the reign of Alexander II. was of the utmost importance. The conquest of the Caucasus was completed in 1864, and central Asia came under the Russian authority (Tashkent, 1867; Samarkand, 1868; Khiva, 1873; Khokand, 1876). By the treaty of Aigun (1858) China ceded to Russia the territory of the Amur. In Europe the Czar, for services rendered Germany in 1870-1, succeeded in obtaining in return, the abolition of those provisions of the treaty of Paris (1856) which restricted the Russian power in the Black Sea. Revolts in Herzegovina and Bulgaria in 1875-6 led the Pan Slavists in Russia to demand intervention in behalf of the Christian population of the Balkans oppressed by the Turkish power. In 1877 Russia declared war against Turkey and a simultaneous attack was begun on the Turkish power in Europe and the Caucasus. On 27 June the Russians crossed the Danube and on 13 July Gen. Gurko crossed the Balkans and advanced to within two days' march of Adrianople. The Russian fortunes then suffered a reverse. Osman Pasha (q.v.) held out in Plevna for 20 weeks against repeated assaults until all hopes of successful resistance were gone (10 Dec. 1877).

Gurko, too, had been driven back, but in the end of December he recrossed the Balkans, and being joined by a second army which on 9 Jan. 1878 captured the Turkish forces at Shipka Pass, made an end of Turkish resistance at Philippopolis, 17 January, occupied Adrianople, and advanced on Constantinople. On 3 March Turkey concluded the Peace of San Stefano, by which Russia acquired a part of Armenia with Ardahan, Batum, and Kars. The independence of Rumania, Servia, and Montenegro was recognized by the Porte, and an autonomous Bulgarian state, extending to the Aegean Sea, erected. The terms of the treaty of San Stefano were radically modified, however, at the Congress of Berlin (q.v.) in the same year.

Alexander II. was succeeded by his son Alexander III. (1881-94), whose reign marked a sharp reaction from the liberal ideals of his father. The Czar was under the influence of the reactionaries Ignatieff, Pobiedonostseff, and Katkoff, the leader of the Old Russian party. The Nihilists were persecuted relentlessly and their repeated attempts on the life of the Czar only confirmed the monarch in his repressive course. The universities were placed under strict supervision and the policy of crushing out all nationalities within the empire but the Russian and all religions but the Orthodox was ruthlessly carried out. The censorship was re-established in all its severity. Within two or three years after the accession of Alexander III. terrorism had been well suppressed, but the subsequent development of a revolutionary labor movement took place in spite of the activity of the police. Under Nicholas II. (1894-) the policy of reaction was continued though in a somewhat modified form. The new ruler was still under the influence of Pobiedonostseff, head of the Holy Synod, and other advocates of repression against whose ascendancy his naturally enlightened impulses could but rarely assert themselves. We may find the Czar's initiative in the rescript of 1898 issued to the nations of the world and calling on them to take steps leading toward disarmament and the establishment of permanent international peace. This was followed by The Hague Peace Conference and the erection of an international court of arbitration at the Dutch capital. The policy of Russification begun under Alexander III. was steadfastly pursued under his successor, the chief field of activity being the Baltic province, Poland, and more prominently Finland (q.v.). In close connection with this policy stand the laws of exception against the Jews who, beginning with 1881, have been subjected to almost unrelenting persecution. When Finland passed to Russia in 1809 Alexander I. had guaranteed the preservation of its autonomy and its language and religion. But, though this guarantee has been renewed from time to time, it did not prevent the Russian government from beginning a determined attack on the liberties of the country. The process reached its height in 1902 when the authority of the Finnish Senate was rendered subordinate to the governor of the duchy appointed by the Czar, who at the same time was given control over the entire administration. Russian was made the official language and the destruction of the Finnish tongue was sought by the suppression of newspapers and periodicals on supposedly political grounds. All

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attempts at resistance on the part of the Finns have been sternly repressed by Governor Bobrikov, and it is only a question of time when Finland shall have lost her liberties as Poland has lost hers. Milder methods of a similar nature have been pursued in the Baltic provinces where Russian has been made the language of the courts, the schools, and the universities, and even the ancient names of well known cities have been changed from German into Russian. In 1882 came the May laws, brought forward by Ignatieff, imposing numerous restrictions on the Jews in respect to rights of residence and occupation, admission to educational institutions, and eligibility to public office. Most oppressive of these provisions is the one forbidding them residence in the greater part of the empire and concentrating them within the Pale of Settlement (15 provinces) in the western provinces, where, crowded together in the towns, the great mass of them has sunk to an abject economic condition. The spirit of anti-Semitism has grown among the Russian population owing to conceived objectionable traits of Russian Hebrews, but it must be admitted that to the agitation of anti-Semitic journalists and the deliberate policy of the government must be ascribed such popular anti-Jewish outbreaks as occurred in May 1903 at Kisheneff, when more than 50 Jews and a number of Christians lost their lives.

The appointment of men like Bobrikov as governor of Finland and Sipiagin as minister of the interior had shown clearly that the government intended to pursue the old policy of repression of liberal movement, and the revolutionary party again resorted to their former and favored means of retaliating the despotic measures of the government. Within the short space of two years quite a number of political murders have been perpetrated. Minister of Public Instruction Bogolepoff was killed by a student Karpovitch, soon after Minister of the Interior Sipiagin was killed also by a student, Stepan Balmashev. The revolutionary propaganda spread like fire throughout Russia and resulted in continuous strikes, riots and uprisings of peasants. In the provinces of Poltava, Kieff and Charkov peasants rose up against the landed proprietors, burned their estates and accompanied these acts by robbery and violence. Troops were sent against them and these insurrections were suppressed with ruthlessness and cruelty, reminding of the Dragonades under Louis XIV., whole villages having been given to the rapacity of soldiers. Finally the peasants were flogged into submission. In Zlatoust, Ufa province, on the Ural Mountains, the strikes assumed such proportions that the troops sent there had to kill and wound about 500 workmen. The cruelty in suppressing the strike cost the governor of the Ufa province, Bogdanovitch, his life, he having been murdered by the revolutionists in the public square of Ufa. In the beginning of 1904 the oppressive policy of General Bobrikov in Finland reached the point when patience ceased to be a virtue and he was shot dead within the walls of the Finnish Senate by the son of a general in the Russian army and a Finnish Senator, Schaumann, who, immediately after the deed, committed suicide. Only two months passed after the assassination of Bobrikov, when Minister of the Interior von

Plehve, who succeeded Sipiagin, was blown up by a dynamite bomb in the streets of Saint Petersburg. Numerous other attempts on the lives of the government officials took place within the last twelve months. Disturbances en masse occur every day and to this are now being added the riots of the reservists who are called to the army and who do not relish the prospect of being made food for powder. The tremendous expenditure of money necessitated by the war compels the government to resort to measures for increasing the revenue, which are not only burdensome upon the impoverished and almost starved population, but are enforced in the way which is repulsive, even to the materially better classes. The commercial depression, the unrest of the population, evident unpopularity of the war with Japan—no doubt had much to do with the selection from a different class of a successor to von Plehve.

The new minister of the interior, Prince Sviatopolk Mirski, is a man of liberal mind, kind hearted, of the highest honor and a scholar. After his appointment, all of a sudden, the press obtained fairer treatment, political exiles have been returned, and the arbitrary dealing with political suspects discontinued. The articles on the burning questions of the day, which now appear even in semi-official papers like 'Novoe Vremia,' are of such character that, under the regime of von Plehve, the writer would have been furnished with a free ticket to the remotest and most desolate part of Siberia and the paper suppressed. More than this; Prince Sviatopolk Mirski has arranged a meeting at Saint Petersburg of the presidents of the Zemstvos of all provinces for the discussion of different subjects with the ultimate purpose in view of putting an end to the present awful state of things in Russia. All the presidents presented their views in a memorial which is submitted to the Czar. The main demands of the Zemstvos are: freedom of the press, speech and conscience; equality of every subject before the law and discontinuance of the arbitrary actions of the officials by making them responsible for their actions before the people. This meeting of the representatives is a thing unprecedented in the annals of the Russian history. It reminds somewhat of the calling of the notables in France in the reign of Louis XVI. Should the Czar refuse to grant the reforms asked by the Zemstvos—the course adopted by Louis XVI.—something startling will take place in Russia. It is rumored that Sviatopolk Mirski declared he would resign should the request of the Zemstvos be ignored.

The foreign policy of Russia since 1881 has been of prime importance in the field of European and Asiatic politics. Alexander III. was a lover of peace and during his lifetime he remained a power for peace on the continent. Affairs in Bulgaria where the Russian schemes were frustrated by the influence of Austria and Germany, threatened war for some time after 1885, but led to no hostilities. The formation of the Triple Alliance was followed by a rapprochement between Russia and France which began to take on a more formal aspect after 1891 and resulted in the conclusion of a defensive alliance. In Asia, however, Russia's policy has been one of constant aggression. Its hold on Turkestan had been firmly fixed by 1881 and

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this was followed by the acquisition in 1884 of Merv, which brought the Russian power in close touch with the sphere of English influence in Afghanistan. In Persia, too, the Russian influence has been exerted toward gaining an outlet on the Asiatic waters. Conquest was consolidated by the building of railways of which the greatest is the Siberian railway planned to connect Saint Petersburg with the Pacific. The appearance of Japan as a factor in Asiatic affairs after her victory over China in 1894-5 aroused Russia to renewed efforts in the Far East. Through the intervention of Russia and Germany, Japan was deprived of its conquests in Manchuria, and in 1898 Russia by a lease from China secured possession for 26 years of the harbors of Port Arthur and Ta-lien-wan in the Liao-Tung peninsula, the very territory of which Japan had been forced to surrender possession. Port Arthur was very strongly fortified and the new port of Dalny built to take the place of Vladivostok as Russia's great ports on the Eastern seas, the last being ice bound during a considerable part of the year. The construction of the Manchurian railway connecting the newly acquired possessions with the main line of the Siberian railway was begun. During the Boxer uprising of 1900 the Chinese attacked the Russian town of Blagovyeschensk on the Amur River, in retaliation for which a Russian force invaded Manchuria, which, after sharp fighting, was overrun and occupied. By a convention between Russia and China, signed in April 1902, the former agreed to retire from Manchuria within 18 months. The sincerity of the Russian intentions, however, was open to doubt; the time was employed by them in increasing their forces in the country and strengthening the fortifications at Port Arthur and Dalny, and when the time for the evacuation of the country had arrived plausible reasons were brought forward for a continued occupation. At the same time Russia evinced a disposition to restrict the commercial rights of foreign nations in Manchuria. This aroused the jealousy of Japan, which deemed its paramount interests in Korea threatened by Russia's aggressive action. Negotiations between the two countries, relative to the situation in Korea and Manchuria, were begun in the fall of 1903 and were prolonged by repeated delays on the part of Russia, till the beginning of February 1904, when it became apparent that war was inevitable and that the purpose of Russia was probably to gain time for strengthening its position in Manchuria. In the first days of February Japan severed diplomatic relations with Russia and hostilities were begun on the night of 7-8 February. During the 18 months of war with Russia, the Japanese showed themselves to be the superior of the two, both on land and sea—on land defeating the Russians and compelling them to retreat as far north as Tie-Ling, and on sea by practically destroying the whole of the Russian fleet in the Eastern waters. The only resistance on the part of the Russian forces worth mentioning was the defense of Port Arthur, where the gallant General Stoessel (q.v.) won undying fame. The losses in men during these 18 months on both sides were enormous, in the battle of Liaoung alone where the number of combatants reached the

enormous figure of half a million, the losses in killed and wounded were counted to be over 100,000 men. The Russian government did not admit any other end of this war except complete victory for Russia, but the Japanese proved themselves superior to the Russians in every respect and, after decisively winning every important battle, concluded peace 5 Sept. 1905. See MANCHURIA; PORTSMOUTH, TREATY OF.

Meanwhile, the whole country was in a state of political ferment and almost anarchic disturbance. Strikes, mutinies, assassinations, mass meetings, demonstrations, and petitions asking for representative government, liberty of assembly, speech, and person, caused ceaseless agitation throughout the empire. The bureaucracy continued its policy of ruthless repression, imprisonment and exile, and man-peaceable demonstrations were turned into scenes of massacre, notably that in Saint Petersburg of 18 Jan. 1905, headed by Father Gapon (later, privately hanged for treachery, by his own party). In the provinces, at Moscow, Warsaw, Riga, Odessa, Reval, Lodz, Radom, and Kovno, disturbances broke out, the educated and professional classes joining with the industrial and agricultural masses in the demand for representative government. In the Caucasus a state of civil war existed between Armenians and Tartars. In Finland the diet refused to recognize the imperial decrees and the governor-general Bobrikoff and the procurator-general Johnsson, were assassinated. On 17 Feb. 1905, at Moscow, the governor-general, Grand Duke Serge, uncle of the Czar, was killed by an anarchist's bomb. A manifesto issued by the Czar on 3 March again ignored the popular demand for a National Assembly, and a general strike of workmen was ordered throughout the country, whereupon a rescript promising a Legislative Assembly was published the same day. At Easter the Czar conferred religious freedom on over 52,000,000 subjects of many faiths, giving equal rights with the orthodox, to Old Believers, Jews, Catholics, Protestants, Buddhists, and Mohammedans. In May and July, congresses representing the zemstvos or elective provincial assemblies, and the municipalities, had assembled at Moscow, and prepared a draft constitution for presentation to the Czar, urging upon him the imminence of a revolution and the desirability that the promise of a constitution should be at once fulfilled. On 19 Aug. the Czar issued a manifesto creating an elective state council (Gosoudarstvennaya Duma), and regulations for elections to the Duma were submitted. On 25 Sept. a Zemstvo Congress was again held at Moscow, which criticized the National Duma to be convoked according to the law of 19 Aug. as not national representation in the correct sense of the word, and declared that representation should be on a national and not a class basis, the election of the representatives being by universal and direct suffrage. In October, the whole country was in a state of passive revolt; an organized strike on railways, gas and electric lighting plants, and other large industries, to enforce purely political demands, compelled the government to accede to the desired reforms. On 30 Oct. the Czar signed a constitution and appointed Count Witte as Prime Minister of a responsible ministry.

The law as promulgated grants the popula-

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tion the firm foundations of civic liberty, based on the principles of inviolability of the person, and of freedom of conscience, speech, assembly and association, and established as an immutable rule, that no law shall come into effect without the approval of the Duma, and that to the elected of the people shall be guaranteed the possibility of a real participation in the control of the legality of the acts of such authorities as are appointed by the Czar. Provision is also made that the members of the Duma representing the governments or provinces and the greatest cities (Saint Petersburg, Moscow, and 26 others), shall hold office for five years, unless the Duma is dissolved by the Czar. The Duma may elect a President and Vice-President annually, and conduct its proceedings in general session and in sections. Ministers and chiefs of Departments cannot become members, but may attend the sessions. Members receive 10 roubles per day and traveling expenses. The election of deputies was indirect, and made by electoral bodies of the chief towns of governments or provinces and of the greatest cities, composed of delegates chosen by the district or town elective assemblies.

The Council of the Empire was reorganized and changes made in the constitution of the Duma under a manifesto and ukases published 6 March 1906. The Council of the Empire as now established, consists of an equal number of elected members and members nominated by the Czar, and is convoked and prorogued annually by Imperial ukase. The Council of the Empire and the Duma have equal legislative powers, and the same right of initiative in legislation and of addressing questions to Ministers. Every measure before being submitted for the Imperial sanction must be passed by both the Duma and the Council of the Empire, and all such as are rejected by one of the two legislative institutions will not be laid before the Czar. Both the Duma and the Council have the right to annul the election of any of their members. The elective members of the Council will be eligible for nine years, a third of the number being elected every three years. Each Assembly of the Zemstvo of each government or province will elect one member. Six members will be returned by the Synod of the Orthodox Church, six by the representatives of the Academy of Sciences and the Universities, 12 by the representatives of the chambers of commerce and industry, 18 by the representatives of the nobility, and 6 by the representatives of the landed proprietors, assembled in Congress at Warsaw. In the provinces of European Russia which have no Zemstvo, a Congress of the representatives of the landed proprietors assemble in the chief towns of their province to elect one member for each province to the Council of the Empire.

All members of the Council must have attained their fortieth year and possess an academic degree. The President and Vice-president are appointed by the Czar. The elective members of the Council receive an honorarium of 25 roubles (\$12.50) a day during the sessions. The sittings of both the Duma and the Council of the Empire are public. The closure of a debate may be voted by a simple majority. Neither the Council of the Empire nor the Duma is empowered to receive deputations or

petitions. Ministers are eligible for the Duma, and, in the capacity of elected members, are qualified to vote.

Laws voted by the two Houses are submitted for the Imperial sanction by the President of the Council of the Empire. The members of both institutions have the privilege of personal immunity during the session. They are only liable to arrest with the permission of the Duma or the Council of the Empire, according to circumstances, except in cases of flagrant offenses or offenses committed in the exercise of their duties. The ukases further provide that bills rejected by one of the legislative bodies cannot be brought forward again without the Imperial consent.

Zemstvo representatives, however, refused to support the Witte cabinet, and their action was endorsed by a Zemstvo congress assembled at Moscow. The Czar appointed Prince Goremykin to succeed Count Witte and the Russian Parliament was opened by the Czar, 10 May 1906, with gorgeous ceremony. The proceedings were marked by great distrust, which also characterized subsequent parliamentary proceedings, the strong opposition of the Court and bureaucratic party to all reform measures being confronted by the persistent tenacity of the national party. While universal suffrage was conceded, the Duma's solution of the agrarian problem was refused, and only a partial amnesty of political offenses granted. The policy of repression continued and the bureaucracy was openly charged with organizing and arming the baser elements of the nation, to incite them against the progressive elements of society, against intelligence, against students, workmen, and Jews. Instigated for reactionary purposes, it was alleged, pogroms or riots in which anti-Jewish outrages of the most horrible character were the chief features, were allowed to go unchecked by the authorities. The records of the massacres at Warsaw, Odessa, Kazan, Rostoff, Kherson, Kishineff, Kieff, Tiflis, Sevastopol excited universal reprobation, while the Bialystok massacre in June 1906 evoked a condemnatory message passed by the Congress of the United States.

On 22 July 1906 the Czar dissolved the Duma, placed Saint Petersburg under martial law, and appointed Peter Stolypin to succeed Goremykin as Premier. The Duma members, meeting at Viborg, Finland, issued a manifesto to the Russian people urging them to refuse to pay taxes, or send conscripts to the army until the power of Parliament be restored. Mutinies of the Cronstadt and Sveaborg (Finland) garrisons were quickly suppressed and the general strike of the Workmen's Councils, declared on 3 August, was called off on the 7th owing to non-support.

Bibliography—Descriptive and General. Geography, Flora, Fauna, Travels, etc.—Aitoff, 'The Russian Empire' (1899); Baer and Helmersen, 'Beiträge zur Kenntnis der russischen Reichs' (Saint Petersburg, 1839-1900); Brandes, 'Impressions of Russia,' English trans. (New York, 1889); Brueggem, 'Das heutige Russland' (Leipzig, 1902); Eckardt, 'Modern Russia,' translation from the German (London, 1870); Erman, 'Archiv für die wissenschaftliche Kunde Russlands' (25 vols., Berlin, 1841-68); Geddie, 'The Russian Empire' (Paris, 1885);

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Gerrare, 'Greater Russia, The Continental Empire of the Old World' (New York, 1903); Leroy-Beaulieu, 'The Empire of the Tsars and the Russians,' English trans. by Ragozin (New York, 1893-94); Morley, 'Sketches of Russia' (Philadelphia, 1890); Munro, 'Rise of the Russian Empire' (Boston, 1900); Noble, 'Russia and the Russians' (Boston, 1893); Norman, 'All the Russias' (New York, 1902); Palmer, 'Russian Life in Town and Country' (New York, 1901); Reclus, 'Géographie universelle' vols. V and VI (Paris, 1880-81); Schnitzler, 'L'empire des Tsars' (Paris, 1856-69); Stoddard, 'Across Russia' (New York, 1891); Wallace, 'Russia' (2d ed. London, 1888); etc. See also bibliographies under **SIBERIA** and **RUSSIAN LITERATURE**.

Ethnology, Civilization, Social Conditions, etc.—Bazan, 'Russia: Its Peoples and Literature' (Chicago, 1890); Buschen, 'Bevölkerung des russischen Kaiserreichs' (Gotha, 1862); Dixon, 'Free Russia' (London, 1870); Duchinski, 'Peuples Aryas et tourans' (Paris, 1864); Foulke, 'Slav or Saxon; The Growth and Tendencies of Russian Civilization' (1899); Hellwald, 'Die Welt der Slayen' (Berlin, 1890); Latham, 'Russian and Turk' (London, 1878); Murray, 'Russians of To-Day' (London, 1878); Pauli, 'The Peoples of Russia'; Rittich, 'Die Ethnographie Russlands' (Gotha, 1877); Schapoff, 'Intellectual Development of the Russian People' (1870); Semenoff, 'The Emancipation of Peasants' (Saint Petersburg, 1889); Stepniak, 'Russian Peasantry and Underground Russia' (New York, 1888); Zograf, 'Les Peuples de la Russie' (Moscow, 1895); etc.

Commerce and Industry.—Antropoff, 'Financial and Statistical Atlas of the Russian Empire' (1898); Besobrasoff, 'Études sur l'économie nationale de la Russie' (Saint Petersburg, 1883-86); Koshkaroff, 'The Money Circulation in Russia' (Saint Petersburg, 1898); Kovalevsky, 'Le régime économique de la Russie' (Paris, 1898) and 'La Russie à la fin XIXème siècle' (Paris, 1900); Matthäi, 'Die Wirtschaftlichen Hulfquellen Russlands' (Dresden, 1883-85); Morea, 'Kommerzielle geographie Russlands' (Saint Petersburg, 1894); Moos, 'Die Finanzen Russlands' (Berlin, 1896); On, 'Histoire du Développement économique de Russie depuis l'Abolition du Servage' (1899); Stieda, 'Aus der Wirtschaftstatistik' (Jena, 1883); Suvorin, 'All Russia: A Dictionary of Industries, Agriculture, and Administration' (Saint Petersburg, 1895); Tugan-Baranoosky, 'The Russian Factory: Past and Present' (Saint Petersburg, 1898); Verstraete, 'La Russie industrielle' (Paris, 1897); Wakefield, 'Future Trade in the Far East' (London, 1896); 'Industries, Manufactures, and Trade of Russia,' published by the Ministry of Finance for the World's Fair at Chicago, and translated into English by J. M. Crawford, United States Consul-General to Russia, 1889-94 (5 vols., Saint Petersburg, 1893).

Politics and History.—Bernhardi, 'Geschichte Russlands und der europäischen Politik un den Jahren 1814-31' (Leipzig, 1868-78); Brückner, 'Geschichte Russlands bis zum Ende des 18ten Jahrhunderts' (1896); Clarke, 'Russia's Sea Power, Past and Present' (1898); Colquhoun, 'Russia Against India'

(New York, 1900); Curzon, 'Problems of the Far East' (London, 1894); Howard, 'Prisoners of Russia' (New York, 1903); Kleinschmidt, 'Drei Jahrhunderte russischer Geschichte 1598-1898' (1898); Kovalevsky, 'Russian Political Institutions' (Chicago, 1903); Krausse, 'Russia in Asia 1558-1899' (Paris, 1899); Lebedev, 'Russes et Anglais en Asia Centrale,' translation (Paris, 1900); Leroy-Beaulieu, 'Études russes et européennes' (Paris, 1897) and 'La rénovation de l'Asie' (Paris, 1900); Mahan, 'The Problem of Asia' (Boston, 1900); Mitchell, 'Russian Picture' (London, 1880); Rambaud, 'History of Russia from the Earliest Times' (3 vols., 1879-85); Samson-Himmelfstrerna, 'Russia under Alexander III.' (1893); Schnitzler, 'Secret History of the Court and Government under the Emperors Alexander and Nicholas' (Eng. trans. Leipzig, 1847) and 'Les institutions de la Russie depuis les réformes de l'empereur Alexander II' (Paris, 1866); Seignobos, 'A Political History of Contemporary Europe,' translation (London, 1900); Stead, 'Truth about Russia' (New York and London, 1888); Strahl and Hermann, 'Geschichte des russischen Staats' (Hamburg, 1832-66); 'Strumm, Russia in Central Asia' (London, 1885); Thompson, 'Russian Politics' (London, 1895); Tikhourirov, 'Russia, Political and Social' (2d ed., London, 1892).

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Russia Leather. See **LEATHER**.

Russia, Orders and Decorations. See **ORDERS, ROYAL**.

Russian Baptists. See **STUNDISTS**.

Russian Church. See **GREEK CHURCH**.

Russian Literature. In the compilation of works on the subject of Russian literature it has been usual to adopt the division of the same into different periods and to go back to early Russian history in search of monuments that may be used in supporting the opinion that Russian literature had its beginning in translations of certain Byzantine church works into old Slavonic, which was the exclusive church language. The heroic traditions, such as 'The Word of Igor's Band' or 'The Don River Slaughter' or the eloquent 'Letter of Vassian to Ioann III.,' are cited in support of the assertions that these productions mark the origin of Russian literature. That such historical documents, folk lore and scholastic eloquence have no more relation to ours than the monuments of antediluvian literature, had such been discovered, have to the Sanskrit, Greek or Latin literatures, is too obvious to need a proof. Russian literature undoubtedly commenced in 1739 when Lomonosov, who earned the nickname of "father of Russian poetry and patriarch of Russian poets," sent from abroad his ode on the 'Capture of Khotin.' Therefore it would be a thankless task for anyone interested in the Russian literature to attempt to find anything approaching the definition of the word literature in all the documents which we possess from the so-called Byzantine Greek period down to the end of the period of Western European influence (1113-1698). There are many reasons for this, such as the Tartar invasion, which actually destroyed the Russian national life,

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but mainly the despotic form of government which obtained in Russia from the time of the Tartar domination down to our own times, and the influence of the orthodox church which, as a supporter of the despotic government, was always opposed to the free egress of human thought. It is a notorious fact that printing was introduced in Russia about 100 years after its discovery. The history of the Russian censorship is one of the blackest pages in the history of the Russian people, and the assertion of a gifted contemporary writer, Menzhikov, that we hardly have any national literature, does not seem to be paradoxical in the least to the persons acquainted with the Russian censorship. The writers who speak of the revival of literature in the sixteenth century and cite as an example the correspondence between Ivan the Terrible and Prince Kurbski have very poor conception of the word literature, because the letters which passed between the insane despot and one of his subjects, who ran away from his insane fury, and found a refuge in Lithuania, should no more be considered literary documents of a country than scribbles of a cannibal king inviting his victims to get cooked. Even Kurbski in his answers to the Czar accuses the latter of being a bad grammarian and fully devoid of knowledge of the proper use of words and expressions. No doubt Peter the Great was instrumental in advancing the progress of the Russian thought and his reign was the precursor of the birth of Russian literature, but the names of early workers in this field are few and far between and, with the exception of Lomonosov and probably Karamzin, cannot be placed among the writers of note. Yet we are accustomed to hear among the names of poets of this epoch that of Trediakovski (1703-68), who at the best was a poor rhymester, whose writings, as our immortal Belinski said, remind us of the senseless dream talk of a sick man. Even what to a certain degree was considered poetical talent in Derjavin (1743-1816) at his epoch, now, in a contemporary writer, we would call prose and a lack of genius. And Derjavin was considered a poet of high attainments, who perfected lyric poetry. We may mention the names of other writers of this epoch such as Sumarokov (1718-77) who imitated, and badly at that, the theatrical plays of Corneille, Racine, and Molière; Fonvisin (1744-92), who is considered to be a satirical writer, but whose satires produce rather the feeling of pity and regret than laughter; Kniajinin (1742-91); Novikov (1744-1818), all of these are not above mediocrity; besides Lomonosov only one other name deserving notice is that of Karamzin (1766-1826) who in his 'History of Russia' gave us the first readable and connected story of our historical past. Generally speaking the Russian literature of the eighteenth century and up to the present time has been and continues to be an imitative one. There is marked absence of originality, though commencing with Pushkin our poetry is original. The writers of the reigns of Anna Ioannovna, Elizaveta Petrovna, and Catherine II. are noted for their obsequious, servile style, which is explained by their having been almost wholly dependent upon the bounty and mercy of the reigning heads. Catherine II. encouraged literature, being herself somewhat of a writer, whose productions, however, beyond the fact that they

came from under the pen of a crowned head, do not represent anything of ability or talent. She was acquainted with the encyclopædists, corresponded with Voltaire and even invited Diderot to St. Petersburg, yet it seems that she acquired but a superficial idea of the teachings of encyclopædists, for, when Radistshev (1749-1802), author of the celebrated 'Voyage from St. Petersburg to Moscow,' depicted in this book the terrible state of serfs under the tyranny of their owners and concluded by the almost identical words of Robbie Burns that "man's inhumanity to man makes countless thousands mourn," she declared him to be a rebel and instigator against the authorities and banished him to Siberia. And to this Radistshev the Russian literature owes more than to any other writer, on account of his having been the first to give the real basis to the philanthropic tendency pervading Russian literature through the whole of the nineteenth century. Later on Turgenev, Belinski, Herzen, and Count Tolstoi continued to carry high the banner of Radistshev. We should not pass unnoticed the name of Jukovski (1783-1852), who, though he did not leave to posterity anything original worthy of note, was one of the best translators of foreign literature, whose poetical translations, thanks to the richness and flexibility of the Russian language, are wonderfully close to the original in German, French, and English, both in the measure and correctness of the translation. He was the first to avoid the use in writing of stiff and affected Russian words and expressions, and to introduce language which is freer and closer to the colloquial form. In Alexander Pushkin (1799-1837) the Russian poetry had first true representative of humanitarian principles; he was the first Russian poet who did not imitate and who was conspicuous for originality of his writings. Of his poems the best known are: 'Ruslan and Ludmila,' 'The Prisoner of Caucasus,' 'Bakhtichisarai Fountain,' 'Robber Brothers,' 'Gypsies,' 'Poltava,' and 'Evgeni Onegin'; of his prose writings 'The Arab of Peter the Great,' 'Captain's Daughter,' and 'Dubrovski' are the most popular. As a writer of epigram he had no equal. Among his contemporaries we may mention Batiushkov, Baratynski, Delvig, and especially Koltzoff, who were his followers in the field of poetry. Koltzoff (1808-42) is best known by his idylls from peasants' life, which contain so much tenderness, so much faith in the patient force of labor that one wonders that such idylls could have been written during the worst time of serfdom. Kryloff (1768-1844) is famous as a fable writer, and Griboyedov (1794-1829), whose comedy-satire 'Grief from Mind,' written in verse, and giving real pictures of life of high society in the beginning of the nineteenth century, will not be forgotten as long as the Russian language exists. Lermontov (1814-41) is another star among the Russian poets; the best of his poems are 'Demon,' 'Mtzyri,' 'Izmail-Bey'; he also wrote a short novelette, 'The Hero of Our Own Time,' which is very popular. It is a noteworthy fact in the history of the Russian literature that but few of its most talented representatives escaped the persecution of the government. Many of them had to pass long periods in prison or exile. One of the most glaring instances of such persecution is that of Polejaev (1805-38), who, had he been

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spared to literature, would have been placed by posterity among our greatest poets. The whim of Nicholas I. sent the unfortunate man to a regiment in the Caucasus, to serve as a soldier, for a trivial offense, if it can be called an offense, of writing a poem ('Sashka,' which, though not very savory, was extremely well written. The intercession of many influential people did not procure his return from the exile where, not being able to endure the rigor of the military discipline, he died of consumption. The reign of Nicholas I., despotic as it was, can boast of several noted writers of whom Gogol (1809-52) is the most remarkable. His prose-poem 'The Dead Souls' gave a complete picture of the officialdom, of traits and manners of persons of every class in Russia in the first quarter of last century. His historical novel 'Taras Bulba' is the most successful novel ever written in Russian; his comedy 'Revisor' is considered a masterpiece of that class of literature. He would have been the most idolized writer in Russia had he not published his 'Selections from the Correspondence with Friends,' which at once destroyed the pedestal upon which he stood so high in the eyes of all intelligent Russians; the only good effect of this publication was that it produced the now famous letter of our immortal Belinski (1811-48) to Gogol. After Nicolai Polevoy (1796-1846), who was a pioneer of the critical literature of Russia, Belinski occupies the foremost place as the most gifted, fearless, and elegant critic Russia ever produced. His followers in this branch of literature were Dobroliubov (1836-61) and Pisarev (1841-68), and later on Michailovski, all of whom were very popular. The last years of reign of Nicholas I. form the most sombre period in the history of Russian literature. The oppression of the censorship was distressing, and though Russian literature did not succumb, it had a hard struggle for existence. And probably this struggle developed quite a number of talented writers. Foremost among them are Count Leo Tolstoi, Turgenev (1818-83), and Dostoevski (1822-81). Count Tolstoi's name is known throughout the world as that of a philosopher, philanthropist, writer, and champion of freedom, both religious and political, for the Russian people. His writings are very numerous, and it is hard to select from them one in which his genius appears at its best. Of his early writings 'War and Peace,' 'Anna Karenina,' and those of recent time 'Kreutzer's Sonata,' 'The Power of Darkness,' and 'Resurrection' are fair exponents of his genius. Of Turgenev's writings the best are 'Memoirs of a Hunter,' written when he was only 27 years of age, 'Fathers and Sons,' 'Virgin Soil,' Dostoevski's 'Memoirs from the Dead House,' 'Crime and Punishment,' 'Idiot,' and 'Humiliated and Abused' breathe with a profound love for all the oppressed, despised, and humiliated. Goncharov (1812-91) is mainly known by his admirable novel 'Obломov,' in which he very artistically brought together all the repulsive traits of a landowner, brought up in the demoralizing atmosphere of serfdom, with the best and most attractive sides of a real Russian. Gri-gorovich (1822-99) and Pissemiski (1820-82), both of whom occupy honorable place in the literature, the former by his 'Anton Goremyka,' and the latter by his novel 'Thousand Souls'

and a realistic drama 'Sad Fate,' the most successful drama ever produced on the Russian stage. Another dramatist and playwright, Ostrovski (1823-86), presented to the public the unattractive character of the Russian merchant in all its nakedness. The best known of his plays are 'The Storm,' 'Poverty is no Vice,' and historical drama 'Vasilisa Melentieva.' The name of Alexander Herzen, a writer who did more than any other man in Russia for the liberation of the serfs, is now given an honorable place in the literature, though some 50 years ago, when he was editor of 'The Bell,' a Russian paper published in London, a letter from him, discovered by the police, was sufficient to have a man deported to Siberia. The most beloved poet of the epoch of great reforms, whose genuine poetry discloses such profound sympathy and love for the people, was Nekrassof (1821-77). Other poets who sang the sorrow of the peasant class were Nikitin (1824-61), Plestsheev (1825-93), Kurotchkin (1831-75), the latter, however, is better known as excellent translator of the songs of Béranger from the French. The Crimean war, exactly like the Russo-Japanese campaign, revealed a great mass of abuses in every department of the government, and produced the feeling of unstability of the whole administrative organism. This feeling found vent in the peculiar expository literature which sprung up on the eve of great reforms, and which denounced the bribe-takers and government thieves in prose and poems, in small stories and in large novels. The most talented among such writers was undoubtedly Michail E. Saltykov (1826-89). His early 'Provincial Sketches' at once placed him in the front rank of Russian literary men. To the end of his days Saltykov continued to denounce the corruption and abuses of the Russian bureaucracy, which did not fail to bring down on him the wrath of the government. His 'Well Meaning Discourses,' 'Messieurs Golovlevs,' 'Pompadours, Male and Female,' and 'Memoirs of a Provincial in St. Petersburg' are the best of his voluminous works. Around Saltykov we see other young writers of the same tendencies, such as Pomialovsky (1835-63), Reshetnikov (1841-71), whose novel 'Podlipovtzy' is often quoted, Levitov (1842-77), and inimitable Gleb Uspensky (1840 or 1843, died a few years ago). Our poets of the second part of the nineteenth century were, so to speak, brought up upon the poetry of Pushkin and Lermontov, but their poetry is much nearer to the reality. Of them deserving note are Maikov (1821-97), Polonsky (1819-98), Shenshin (pseud. Fet) (1820-92), Tutchev (1803-73), May (1822-62) and Count Alexis Tolstoi, the latter besides his many songs and poems, wrote a remarkable historical novel, 'Prince Serebrianniy,' and three trilogies, 'Death of Ivan the Terrible,' 'Czar Feodor Ioannovitch,' and 'Czar Boris.' The epoch of great reforms produced the division of our fiction writers into two classes: conservative and liberal. To the former, who, disappointed in the liberal movement and its leaders and influenced by the Polish insurrection, commenced a crusade against the liberal movement, belong Leskov, Kliushnikov, Markevitch, and Krestovski, whose writings, not even always talented, have the stamp of having come out from a detective bureau, because they excited suspicion

in treason and contained libels even against persons occupying high official positions, accusing them of being nihilists and anarchists. To the liberal class belong Terpigorev (1841-95), Garshin (1855-88), whose untimely death deprived Russian literature of one of the most talented writers. Another name which occupies an honorary place in Russian literature is that of Nicolai Tchernyshevski (1828-1903), who is best known by his novel 'What is to be Done,' which at the time produced quite a sensation among the young Russia, being a sermon of communism, though it did not disclose anything new to the readers of Eugene Sue's novels, containing similar Utopias. He wrote a good deal on politico-economical questions, but these articles lost all their interest and grew old; and his notes on Mill's 'Political Economy,' which represent the system of Louis Blanc, will also appear childish from the point of view of modern socialism. Among the contemporary writers there is quite a number of talented followers of the humanitarian school, men who represent the best element of the Russian intelligent society. Of the writers of fiction Albov, Zasodimski, Ertel, Korolenko, Zlatovratski, Maria Krestovskaja, Mamin-Sibirski, Salov, and Lugovoi are the most popular and the most sympathetic. The most talented writer, who is called Russian Maupassant, Anton Tchekhov, died on 15 July 1904. His best works are 'My Life' and 'Peasants.' The names of Maxim Gorki and Leonid Andreev are those the most quoted at the present time. Maxim Gorki, undoubtedly a talented writer, uses his talent in depicting the life of the dregs of human society, vagrants, thieves, and inhabitants of the dens of vice and, strange to say, has the tendency to idealize his heroes. The most powerful of his novels is 'Foma Gordeev,' the only one which probably will survive him. As to Leonid Andreev, his popularity is purely the result of the unbounded — sickening at times — naturalism of his stories. Of contemporary poets the following are of note: Nadson (1862-87), a very talented poet, yet his poetry is too pessimistic to please all. Jemchujnikov, Korinsky, Slutchevski, and especially Miss Stchepkina-Kupernik. One of the grand dukes, Konstantin Konstantinovich, who writes under the pseudonym 'K. R.,' is a poet of no mean degree. Among the followers of decadent school of poets are Merejkovski, Balmont, and Minski, but their poems, like those of Frug and Fofanov, serve mostly as subjects for comical reviews by our well known critic Burenin. Of the dramatists the best known are Potekhin, Krylov, and Shpajinski. Consult: Belinski, 'Russian Literature'; Polevoy, 'History of Russian Literature'; Sementkovski, 'Russian Literature on the Eve of the Twentieth Century'; Soloviev, 'Literary Movement of the Nineteenth Century in Russia.'

V. P. POLEVVOY,
Ex-Officer of the Russian Artillery.

Russian Thistle, a naturalized annual (*Salsola tragus*) (one of the *Chenopodiaceae*), becoming a dreaded pest in the northern and western United States. It is closely related to, and resembles, the prickly salt wort of the sea-beaches and in no way, except spininess, can be confounded with the true thistles. It is a glabrous, succulent, spreading bushy herb, with slender branches and small linear leaves, tipped

by a prickle, and usually bright red at maturity. Its small flowers are single in the axils, and are succeeded by hard little fruits surrounded by broad, five-parted horizontal wing of the calyx, which is conspicuously veined. Like many desert plants, at maturity, and in the dry season, its branches contract into a ball, enclosing its capsules full of ripe seeds, and it becomes a 'tumble-weed,' blown across the country by the wind, and scattering its seeds, to take root in favorable soils. Careful cultivation is the best way to exterminate the Russian thistle.

Russ'niaks. See RUTHENIANS.

Rust, peroxide of iron, formed by the gradual oxidation of iron when exposed to the air. To remove rust the usual mode is to rub the object with a piece of oiled rag or emery paper. More rapid and more satisfactory results are secured by using very pure petroleum, and wiping with a hempen or woolen rag. To prevent rust, dip iron or steel articles in a mixture of equal parts of carbolic acid and olive-oil, rubbing the surface with a rag. Others rub the metal with a mercurial ointment, leaving a thin layer over the entire surface. If iron be dipped in a solution of carbonate of potash or soda in water the surface will be protected against rust for a long time, and objects can be protected for any period by burying in quicklime. Rubbing the surface with plumbago has a similar effect.

Rustchuk, roos-chook', Bulgaria, a town on the right bank of the Danube, at the confluence of the Lom, opposite Giurgevo, 42 miles southwest of Bucharest. It has some woolen, silk, and other manufactures, and considerable trade. It is of strategic importance owing to its position on the Turkish frontier, and was almost destroyed by the Russian bombardment in the war of 1877-8.

Rusts. See FUNGI.

Rutaba'ga. See TURNIP.

Rutaceae, roo-tā'sē-ē, a widely dispersed order of polypetalous plants with about 880 species, most frequent in warm regions, and especially so in South Africa and Australia. They are generally shrubs or trees, bearing leaves in various forms, without stipules, dotted with glands and often heavy-scented. The four- or five-merous flowers are often in axillary cymes, and the fruits are various, being most conspicuous in the genus *Citrus*, which produces the orange and lemon. Two American genera are the *Ptelea* (hop-tree), and the *Xanthoxylum*, or prickly ashes. The latter is represented by small trees, prickly, with a powerfully stimulative and tonic bark. The common rue is a member of the typical genus *Ruta*.

Rutgers, rūt'gérz, Henry, American philanthropist: b. New York 7 Oct. 1745; d. there 17 Feb. 1830. He was graduated from Columbia in 1766; served as captain and later as colonel of New York militia in the Revolutionary War, and entered the legislature in 1784 to which he was frequently re-elected. He was a member of the board of regents of New York University from 1802 to 1826. His gifts to public purposes were many, the chief being \$5,000 to Queen's

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College of New Jersey, which thereupon took the name of Rutgers.

Rutgers College, located at New Brunswick, N. J. It was chartered in 1766 under the name of Queen's College, and the charter slightly altered in 1770. In 1771 the college was located at New Brunswick; during the Revolutionary War, when the British army occupied New Brunswick, the college exercises were continued at Millstone and at North Branch. The present site of the college was secured in 1808, and in 1825 a generous donation was received from Col. Henry Rutgers, and the name changed to Rutgers College in his honor. A theological school was at first affiliated with the college, but has since become an independent institution. There is a preparatory school established at the same time with the college. The organization of the collegiate department now includes two schools, the classical school and the Rutgers Scientific School. In 1864, the Legislature designated "The trustees of Rutgers College in New Jersey maintaining the Rutgers Scientific School" as the State College of Agriculture and Mechanic Arts; the Scientific School thus became the beneficiary of the Congressional land grant of 1862, and of the appropriation law of 1890. In the classical school the work of the freshman and sophomore years is required, two courses are elective for junior and senior years; the degrees of A.B. and B.L. are conferred. In the Scientific School the studies of the freshman year are the same for all courses, at the end of that year the student elects one of the six courses offered, certain subjects, such as English, history, political economy, etc., being required in all. The six courses are agriculture, civil engineering, and mechanics, chemistry, electricity, biology, clay-working and ceramics. All courses lead to the degree of B.S. There is also a special two years' course in ceramics. Military drill is required of all students in the Scientific School. The school conducts a university extension department, and the State agricultural experiment station is connected with it. The Scientific School is under control of the college board of trustees of which the governor, the chief justice, and the attorney-general are members *ex officio*; and is also under the supervision of a State board of visitors appointed by the governor. The college farm contains 100 acres and is well equipped with modern apparatus. The buildings on the campus include Queen's College, Fine Arts Building, Van Nest Hall, Geological Hall, Kirkpatrick Chapel and Library, State Laboratory, Ceramics Building, Winants Hall (dormitory) and the Ballantine Gymnasium. The library in 1910 contained 62,000 volumes; the students in the collegiate department numbered 420 and the faculty 40.

Rutgers Scientific School, a department of Rutgers College, New Brunswick, N. J., designated by law as the New Jersey State College of Agriculture and Mechanic Arts. See **RUTGERS COLLEGE**.

Ruth, Book of, a canonical book of the Old Testament, containing four chapters. The date of the little history contained in this book cannot be precisely fixed. Who the writer of the book was is also unknown. Some have ascribed it to Samuel; others have placed it as

late as the Babylonish captivity; whilst several of the best modern scholars regard it as post-exilic. On the one hand, the style of the narrative connects it with the period when the Hebrew language and literature were still in full vigor and freshness, not with the period of their decay. On the other hand, it is evident that it cannot be placed earlier than the time of the kings, first, from the way in which the judges are mentioned in chap. i.; secondly, from the change in the customs of the people that must have taken place between the date of the events and that of the narrative that records them (chap. iv. 7); and thirdly, from the mention of the name of David. In the Hebrew Bible the Book of Ruth now stands among the Hagiographa immediately after the Song of Solomon as one of the five Megilloth, or sacred rolls, read on occasion of the principal Jewish solemnities. But there can be no doubt that originally in the Hebrew Scriptures, as in the Septuagint and in the English Bible, it followed the Book of Judges, and was sometimes even reckoned part of it.

The story told in the Book of Ruth is a charming epic, relating the love of Ruth, a young widow of the tribe of Moabites, for Naomi, the mother of her dead husband. Ruth and her mother-in-law were very poor, and Ruth gleaned in the fields of Boaz, a rich husbandman of Bethel. Boaz, upon noticing the lovely Jewess, directed his harvesters to leave a generous supply of grain on the ground, thus enabling Ruth to glean a plenty. Subsequently Ruth married Boaz; she was the great-grandmother of David. Consult 'Popular Introduction to the Book of Ruth,' by R. W. Bush (London, 1883).

Ruthe'nians, Rusaniaks, or Red Russians, are the Slavonic tribes inhabiting eastern Galicia, Bukowina, and northeastern Hungary. The number of Ruthenians in the Austrian Empire amounts to 3,000,000, of whom about 500,000 are settled in Hungary. Very few can read or write. Their dwellings are wretched huts of boards and mud. Superstition is very rife. In the popular songs, which have a close connection with those of the other Slavonic nations, there is a prevalent strain of sadness both in the words and in the melodies. The occupations of the people are pasturage, agriculture, and carrying (by means of conveyances drawn by animals). Of manufacturing industry there is no trace. The towns are inhabited by Poles and Jews; the nobility are Polonized. The Ruthenians belong for the most part to the United Greek Church, and pay a blind obedience to their clergy. They are bitterly hostile to the Poles, and latterly their efforts have been directed to the separation of Galicia into a Polish kingdom in the west and a Ruthenian in the east. They have likewise begun to attach themselves in their literature to Russia, allowing the Ruthenian dialect to drop out of existence as a literary tongue.

Ruthe'nium, a metal of the platinum group. It has the atomic weight 101.7, and the symbol Ru. Some specimens of platinum ore contain from 3 to 6 per cent of ruthenium. It is a whitish-gray metal, having a specific gravity of 11 to 11.4; is very infusible, more so than any other metal except osmium; is

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scarcely attacked by nitromuriatic acid, but is more easily oxidized by fusion with nitre, chlorate of potassium, etc., than platinum. Ruthenium forms a series of salts which are analogous to those of platinum.

Rutherford, N. J., borough in Bergen County; on the Erie railroad; about nine miles from New York, seven miles southeast of Paterson, and eight miles north of Jersey City. It is a residential place, occupied chiefly by business men from New York. Several electric lines connect the borough with many of the cities and boroughs in the vicinity. Its principal public buildings are churches, schools, and a public library. Pop. (1910) 7,045.

Rutherford, Ernest, Canadian physicist: b. Nelson, New Zealand, in 1871. He was educated at Nelson College and the University of New Zealand, and at Trinity College, Cambridge, England. He was awarded the 1851 Exhibition Science Scholarship in 1895 and from that time until 1898 worked at research in the Cavendish Laboratory, Cambridge, in the latter year being appointed professor of physics in McGill University, Montreal. In 1903 he was elected a Fellow of the Royal Society; in 1904 delivered the Bakerian lecture before the Royal Society and was awarded the Rumford Medal; in 1905 delivered the Silliman lectures at Yale University. Since 1907 he has been director of the physical laboratories of Manchester University, England. In 1908 he was awarded the Nobel prize for chemistry. He has published 'Radioactivity' (Cambridge University Press 1904).

Rutherford, rŭth'ér-férđ, Lewis Morris, American astronomer: b. Morrisania, N. Y., 25 Nov. 1816; d. Tranquility, N. J., 30 May 1892. He was graduated from Williams College in 1834, admitted to the bar in 1837, and practised law in New York until 1849. He then devoted himself to the study of science, making valuable investigations in the departments of astronomical photography and spectral analysis. He made several instruments for use in his laboratory, among which were an object glass, a micrometer for measuring astronomical photographs and a dividing engine (q.v.) of great value. He was a trustee of Columbia University from 1858-84, when he resigned and presented his astronomical instruments to that institution where they are now mounted, and was also one of the original members of the Academy of Science.

Ruthven, rŭth'vén (Scotch, rŭv'én), **Raid** of, one of the strangest conspiracies in British history, and even as yet unexplained, in which an attempt was made on the life of James VI., then king of Scotland, and afterward, as James I., king of England, after being decoyed to Gowrie House, at Perth, in the month of August, 1600, by Alexander Ruthven, brother of the Earl of Gowrie. See GOWRIE CONSPIRACY.

Rutland, Vt., city, county-seat of Rutland County; on the Otter and East creeks, and on the Rutland, B. & R., and the Delaware & H. R.R.'s; about 56 miles south-southwest of Montpelier, the State capital, and about 62 miles south by east of Burlington. It was settled in 1770 by persons from the East and was incorporated in 1761, by New Hampshire. It was chartered as a city in 1892. Rutland was

in the battle region of the War of the Revolution. Two forts were erected here, as it was situated on the Great Northern Military Road. In 1781 it was made the capital of the county, and from 1784 to 1804 it was one of the State capitals. The old boundaries included an area of 26,000 acres with the Green Mountains on the east and the Taconic Range on the west. In 1886 the towns of Proctor and West Rutland were set off from Rutland. The area of the city (1903) is $8\frac{1}{4}$ square miles. The new towns have independent governments, but all are united commercially. Rutland is in an agricultural region, but is well-known for its extensive marble quarries and industries connected with the shipment of marble. Iron ore, fire-clay, and slate are found in the vicinity. The marble works have been of considerable importance since 1830. The quarries are now in the new towns, but the industries continue as formerly. The chief industrial establishments of Rutland are manufacturing in which are made machinery for quarrying, and channeling marble, machine shops, engine and boiler works, Howe's scale factory, sash, door, and blind factories, butter and cheese factory machinery, lumber and brick yards, sugar evaporator works, creameries, and flour and grist mills. The government census of 1900 gives the number of manufacturing establishments 63; the amount of capital invested, \$2,650,000; number of wage-earners in manufacturing, 1,810; annual amount of wages, \$924,000; value of product, \$2,680,000. The principal buildings are Memorial Hall, built in honor of the soldiers of Rutland who fell in the Civil War, Baxter Memorial Hall, the government building, the county court-house, city-hall, house of correction, opera house, bank buildings, churches, and schools. The material for the construction of Memorial Hall was donated by the marble quarry companies and the cost additional was \$60,000. The educational institutions are a high school, Saint Joseph's Academy, public and parish graded schools, the Rutland Free Library, and Baxter Memorial Library. The city is well equipped with banks, newspapers, and wholesale and retail business establishments. Pop. (1890) Rutland 11,760; West Rutland, 3,680; Proctor, 1,758; total, 17,198; Rutland (1900) 11,499; (1910) 13,546. Consult: Hemmingway, 'Gazetteer of Vermont'; Moore, 'Churches of Rutland, Vermont.'

Rutledge, rŭt'lěj, Edward, American soldier and legislator: b. Charleston, S. C., 23 Nov. 1749; d. there 23 Jan. 1800. He was admitted to the bar in 1773, established a practice in Charleston and in 1774 was elected to the Continental Congress. He was a signer of the Declaration of Independence in 1776 and a member of the first board of war. In this capacity he was delegated with John Adams and Benjamin Franklin to confer with Lord Howe on the subject of a reconciliation, but declined to treat with him excepting on the basis of American independence. As lieutenant-colonel of the Charleston artillery he assisted in expelling the British from Port Royal in 1779 and in 1780 was captured. After his release a year later he resided in Philadelphia, was a member of the Jacksonborough legislature in 1782, and after the war returned to Charleston where he resumed his law practice. He was for many years

a member of the State legislature, was elected United States Senator in 1794, and governor of South Carolina in 1798. Consult McCrady, 'South Carolina in the Revolution' (1901-2).

Rutledge, John, American jurist; brother of Edward Rutledge (q.v.): b. Charleston, S. C., 1739; d. there 23 July 1800. He studied law in England, returned to Charleston in 1761, and there established himself in law practice. From the outset of his career he was an ardent opponent of the oppressive laws governing the colonies and as delegate to the congress at New York in 1765 openly advocated the united resistance of the colonies. In 1774 he was a member of the South Carolina convention which carried a resolution that South Carolina should be represented in the Continental Congress. He served as delegate to the Congress of 1775 and in 1776 was chairman of the committee that framed the South Carolina constitution, was elected president of the State government and commander-in-chief of the militia. When the British forces arrived off Cape Fear he fortified Charleston and prevented the invasion of the State. He resigned his office in 1778 through dissatisfaction with changes in the constitution, but was recalled in the following year and invested with dictatorial authority. He at once set about preparations for defense and held the city until 1780. He then joined the forces of General Greene and upon the recapture of Charleston resumed his duties as governor. In 1782 he was elected to the Continental Congress, was re-elected in 1783 and in 1784 became chancellor of South Carolina. He was a member of the convention which framed the Constitution of the United States in 1787. He became chief justice of his State in 1791, and in 1795 was appointed chief justice of the Supreme Court. His mind failed in the following year and he held no further public office.

Ruwenzori, roo-wën-zō'rē, a group of mountains in Africa, north of the equator, discovered by Stanley in 1888, in his great journey from the west to the east coast, when he brought Emin Pasha away with him. It appears to be a chain of heights about 16,000 feet in elevation, and is clad with snow and traversed by large glaciers. It lies about 200 miles to the westward of the Victoria Nyanza, and between the Albert Nyanza and Albert Edward Nyanza. The river Semliki, which connects the two lakes, flows in a valley near the range. The snow-line is about 13,000 feet above sea-level. These mountains are sometimes identified with the Mountains of the Moon, spoken of by ancient writers.

Ruysbroeck, rois'brék, or **Rusbroek**, roos'brök, **Jean de**, Dutch mystic: b. Ruysbroeck 1293; d. Grönendal 1381. He was educated at Brussels and for 26 years was vicar of the church of St. Gudula there. In 1353 he renounced the secular priesthood and entered the Augustinian monastery of Grönendal, in the forest of Soigny, where he became prior, lived a contemplative life and wrote his mystical works. His four principal works are 'Die Zierde der geistlichen Hochzeit'; 'Der Spiegel der Seligkeit'; 'Von dem funkelnden Stein'; and 'Samuel.' They were originally written in Dutch and are regarded by his countrymen as

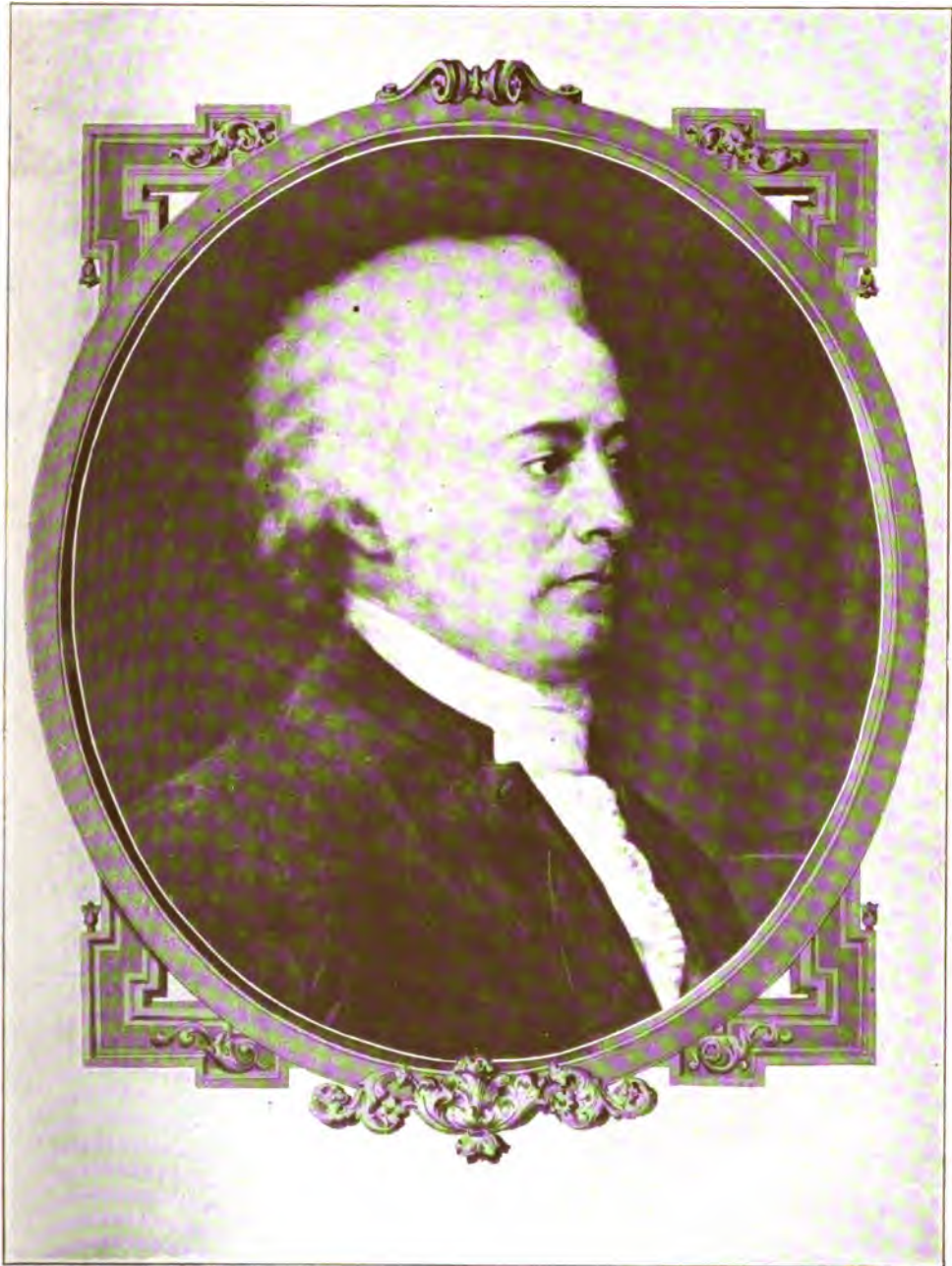
among the best prose of the Netherlands during the Middle Ages. Translations were made into German, French and Latin. The four works cited were edited by Arnswaldt (1848); no collected edition has been made embracing his other works, which however, are mainly restatements of the main features of the foregoing. Consult: Engelhardt, 'Richard von S. Victor und Johann Ruysbroek' (1838); Ullmann, 'Reformatoren vor der Reformation.'

Ruysbroek, Willem van (GUILLAUME DE RUBRUQUIS), Franciscan friar and traveler: b. Brabant about 1215; d. some time after 1293. He was sent by Louis IX. of France to Central Asia to bring about an alliance with Sartach, a supposed Christian prince of Kiptohak, then at war with the Saracens. In May 1253 he set out from Constantinople upon his mission with two other Franciscan friars and an interpreter; crossed the steppes, now a part of the Russian province of Ekaterinoslav, reached the banks of the Don, and, after many hardships, the camp of Sartach near the Volga. Refused permission to preach Christianity in Tartary, he made his way across the Caucasus into Armenia, Persia and Asia Minor, reaching Tripoli in Syria in August 1255. An account of the countries and peoples visited by these missionaries was written by Ruysbroek and sent to the French king. The best modern translation is that of Michel and Wright in Vol. IV of 'Receuil de Voyages et Mémoires de la Société de Géographie' (1839).

Ruysdael, Jacob van. See RUISDAEL.

Ruyter, ri'ter (Dutch, roi'ter), **Michael Adriaanzoon de**, Dutch admiral: b. Flushing 24 March 1607; d. Syracuse, Italy, 29 April 1676. He early entered the navy and rose from cabin-boy to captain (in 1635). In 1641 he was placed as rear-admiral in command of a fleet sent to the assistance of the Portuguese, who had thrown off the yoke of Spain, and he was afterward employed against the Barbary corsairs. In the war between the Dutch and English, which commenced in 1652, Ruyter repeatedly distinguished himself, especially in the battle fought in February 1653, near the mouth of the Channel, in which Blake, commanding the English, defeated Tromp and Ruyter, who commanded the Dutch. He became vice-admiral of Holland after the death of Tromp in 1653 and afterward served against the Portuguese, the Swedes, and the Algerines. He commanded in the great battle fought in the Downs in June 1666, against Prince Rupert and the Duke of Albemarle, and in the following year made his memorable expedition up the Thames, when he destroyed Upnor Castle and burned some ships at Sheerness. He was made admiral-in-chief of the Dutch fleet and commanded at the battle of Solebay (Southwold Bay) in 1672, when the Dutch were defeated by the English under the Duke of York; but in the following year gained a victory over the combined English and French fleets. Consult 'Life' by Milne (1897).

Ryan, ri'an, Abram Joseph, American poet and Roman Catholic clergyman: b. Norfolk, Va., 15 Aug. 1839; d. Louisville, Ky., 22 April 1886. He became a chaplain in the Confederate army shortly after his ordination to the priesthood, and served until the close of the war, afterward engaging in clerical labors in New Or-



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JOHN RUTLEDGE.
CHIEF JUSTICE OF THE UNITED STATES SUPREME COURT, 1795.



MOST REVEREND PATRICK JOHN RYAN.

RYAN—RYBINSK

leans, where he edited the 'Star.' He subsequently removed to Knoxville, Tenn., and thence to Augusta, Ga., where he established the 'Banner of the South.' He was later in charge of a parish in Mobile, Ala., but in 1880 went North where he engaged in lecturing and also supervised the publication of his poems, subsequently returning to the South. His works include 'The Conquered Banner and other Poems' (1880); 'Poems' (1880); etc.

Ryan, Edward George, Chief Justice for more than six years of the Supreme Court of the State of Wisconsin: b. Newcastle House, near the village of Enfield, County Meath, Ireland, 13 Nov. 1810. His father, Edward, was a younger son of the family of Ryan, of Ballinakill; his mother, Abby, was the eldest daughter of John Keogh, chairman of the Catholic Committee of Mount Jerome. By means of an annuity, obtained from this Keogh, the ten children of Edward and Abby received an excellent education. Edward George was sent to Clongowes Wood College, where he remained from 1820 until 1827. He was always destined for the law and was nominally engaged in its pursuit in 1828 and 1829. Obtaining his father's consent, he removed to New York city in 1830, where he studied law, supporting himself by teaching. Admitted to practice in 1836, he removed in the same year to Chicago, Ill. In 1839 he became the editor, in that city, of a newspaper called the *Tribune*, Democratic in politics and closing its career in 1841. During a portion of this editorial period he was prosecuting attorney of Cook County. Mr. Ryan's health being poor in Chicago, he removed in 1842 to Racine, Wis., and in December 1848 to Milwaukee in the same State. While residing in Racine he was in 1846 a delegate to a convention at Madison, the capital of the then territory, which met to frame a State constitution. As chairman of the committee on banks and banking, and member of the committees on the judiciary and on education he wielded great influence in the deliberations of the convention. While the constitution which this convention framed was repudiated by the people, yet the reputation of Mr. Ryan as a lawyer and a publicist was established.

As a practitioner in Milwaukee he achieved great renown, especially in criminal causes. His most conspicuous effort was in 1853, when he was employed to assist the managers of the Assembly of Wisconsin in its impeachment before the State Senate of Levi Hubbell, Judge of the Second Judicial Circuit. This trial ran through many weeks and was characterized on Mr. Ryan's part by the most skilful treatment of witness and by the most powerful invective in denunciation of the defendant.

Although a Democrat of the States rights school, Mr. Ryan was always loyal to the Government of the United States. The 'Ryan Address' issued by him in 1862 did much to uphold the hands of the Government in its struggle for existence.

On the 7th of June, 1874, Mr. Ryan stepped from active practice at the bar to the position of Chief Justice of the Supreme Court. This was by executive appointment. In April, 1875, he was elected by the people to the same office for a term to expire in January, 1882. He did

not survive to finish this term. He died in Madison on 19 Oct. 1880.

WILLIAM W. WIGHT.

Ryan, James, American Roman Catholic bishop: b. Thurles, County Tipperary, Ireland, 1848. He came to the United States when a child, studied for the priesthood at the seminaries of Saint Thomas and Saint Joseph, Bardstown, Ky., was professor at Saint Joseph's and after ordination served on the Kentucky mission for seven years. In 1878 he was appointed to a charge at Wataga, Ill., and afterward was for a time at Danville. He was rector of Ottawa from 1881-8, when he was consecrated bishop of Alton.

Ryan, Patrick John, American Roman Catholic prelate: b. Cloneyharp, Ireland, 20 Feb. 1831; d. Philadelphia, Pa., 11 Feb. 1911. He studied at the Christian Brothers' school in Thurles and began his classical course at Mr. Naughton's school, parish of Rathmines. Determined to become a missionary in the United States, he entered Carlow College and after receiving sub-deaconship there, came to the diocese of Saint Louis, Mo. He was ordained to the priesthood in 1853, made rector of the cathedral and subsequently appointed pastor of the Church of Saint John the Evangelist and vicar-general of the Saint Louis diocese. In 1868 Father Ryan accompanied Archbishop Kenrick to Rome and while there preached a series of Lenten sermons that elicited great praise. On 14 April 1872, he was consecrated Titular Bishop of Tricomia and coadjutor to Archbishop Kenrick and on 11 Jan. 1894 was elevated to the titular archbishopric of Salamis, being transferred the same year to the archiepiscopal see of Philadelphia. In 1883 he was among the United States prelates chosen to visit Rome in the interest of the Catholic Church in America. He gave two annual inaugural addresses at the State University of Missouri, lectured twice before the representatives of the Missouri legislature and delivered discourses in nearly all the large cities of the United States, notable among these lectures being that on Modern Skepticism. He published 'What Catholics Do Not Believe,' and 'The Causes of Modern Religious Skepticism.' In 1902 President Roosevelt appointed Archbishop Ryan a member of the Indian Commission and he was a member of the Executive Board of Catholic Indian Missions. The archdiocese of Philadelphia, over which he so ably presided, has a Catholic population of about 475,000; more than 500 priests; 240 churches; 117 parochial schools; 5 hospitals and 12 orphanages besides many benevolent and educational institutions.

Ryazan, rĕ-ā-zān'. See RIAZAN.

Rybinsk, rū'bĕnsk, or **Rubinsk**, Russia, in the government of Yaroslavl, 52 miles northwest of Yaroslavl, on the Volga, at the confluence of the Rybinsk. As the port of Saint Petersburg, it is one of the most important points of north central Russia. It became a centre of traffic when the three canal systems connecting Saint Petersburg with the Volga were opened. Its enormous business of transshipment and active trade in grain and hemp, during the season, increases the population by nearly 100,000 workers. Permanent pop. about 30,000.

RYDAL - RYE

Rydal, England, a picturesque village in the county of Westmoreland, two miles northwest of Ambleside. It is situated in a narrow gorge formed by the projection of two mountains near Rydal Lake. The lake, only half a mile in area, contains two beautiful islets, is encircled by meadows and dominated by rocky heights which add to the charm and calm beauty of the surroundings, so celebrated in English literature. Rydal Hall is a fine mansion in a park which contains many grand forest trees and a cascade immortalized in verse by Wordsworth, who lived for some years at Town End, near by, the residence also for a time of De Quincey.

Rydberg, rüd'bërg, **Abraham Victor**, Swedish writer: b. Jönköping 18 Dec. 1829; d. Stockholm 21 Sept. 1895. He studied at the University of Lund, and in 1855 entered journalism, contributing to the leading paper of Gothenburg. In 1868 he was sent to an assembly of the church where he was the champion of liberal ideas, and from 1870 to 1872 sat in the Riksdag. In 1882 he became professor of the history of civilization at Stockholm. He is the author of 'The Pirate of the Baltic' (1857); 'The Last of the Athenians' (1859), which has been translated into English, German, and Danish; 'The Doctrine of Christ According to the Bible' (1862); 'Magic of the Middle Ages' (1864); 'Romish Legends of the Apostles Peter and Paul' (1871); etc. His works include studies in æsthetics, philosophy and psychology, besides poetry and a translation of Goethe's 'Faust,' and he is regarded as one of the foremost Swedish men of letters.

Ryde, rid, England, a watering-place in the Isle of Wight, on the Spithead shore, seven miles east-northeast of Newport. It is regularly laid out on a sloping site, and is a picturesque, elegant, and well patronized summer-resort, having regular and frequent steamboat communication with Portsmouth, Portsea, Southsea, etc. Pop. about 13,000.

Rydellius, Andrew, Swedish prelate and scholar, b. Linköping, in 1671; d. 1738. He studied under John Bilberg, and became instructor of philosophy and theology at Lund, where later he was appointed bishop. In 1718 he published a 'Course of Philosophy'; his other works include 'Grammatista Philosophans'; 'Sententiæ Philosophiæ Fundamentales'; 'Orationes Academicæ.'

Ryder, ri'der, **Albert Pinkham**, American artist: b. New Bedford, Mass., 19 March 1847. He studied his profession under William E. Marshall and in the art schools of the National Academy of New York. He has made a specialty of pastoral landscape and has been styled 'the last of the Romanticists.'

Ryder, William Henry, American Universalist clergyman: b. Provincetown, Mass., 13 July 1822; d. Chicago, Ill., 8 March 1888. He engaged in preaching when but 19 and at 21 became pastor of the First Universalist Society in Concord, N. H. He afterward preached at Nashua for two years and then traveled in the Holy Land. In 1850 he accepted the pastorate of the Universalist Church at Roxbury, Mass., from which he resigned in 1860 to become pastor of Saint Paul's Church, Chicago. At his death he bequeathed more than half a million dollars

to various charitable, educational, and religious organizations without regard to any difference in creed.

Rydvist, John Erik, Swedish author and critic, b. Gothenburg 20 Oct. 1800; d. 19 Dec. 1877. He abandoned trade in 1820 to study law and ancient languages, and in 1827 received a civil appointment in the central administration. He became known by his literary and critical works, joined the staff of the Royal Library at Stockholm, and in 1843 was appointed chief librarian. The same year he succeeded Berzelius as member of the Swedish Academy. Besides numerous translations of Greek and English works into Swedish, literary and critical essays published in various collections, notably in the 'Heimdal,' a critical review that he conducted from 1828 to 1832, his principal works include 'The Chief Literary Events of Past Ages' (1828); 'The Most Ancient Stage Works of the North' (1836); 'The Civil Service in Sweden' (1838); 'J. Olof Wallin' (1839), a biographical study; 'Travels in Germany, France and Italy' (1838); and 'The Laws of the Swedish Language' (2 vols. 1850-57), a philological work of great value.

Rye, N. Y., a town of Westchester County, on the New York, New Haven & Hartford R.R., eight miles northeast of New Rochelle. Rye was founded in 1660, and five years later was organized as a town of Connecticut, the border line not being settled until 1700. One of Rye's interesting features is the Jay homestead, where John Jay spent his youth. Port Chester, a manufacturing village is within the boundaries of Rye, and Rye Beach on Long Island Sound, with its picturesque colony of bungalows, cottages and shacks, is a favorite summer resort for bathing, boating and other recreations. Pop. (1910) 3,964.

Rye (*Secale cereale*), a plant of the grass family, and allied to wheat, which yields the fifth most important cereal crop in the United States. It is an erect hardy annual, with slender stiff culms from four to six feet high, flat leaves, and a terminal, compact, somewhat flattened, bearded spike from four to six inches long. The spikelets are usually two-flowered, sessile, compressed, alternate, convex on one side and flat on that next the rachis. The outer glume is keeled and often carries a short awn, while the flowering glume carries a long awn. Each floret has three stamens and two very short styles. The grain is oblong, furrowed on the inside, hairy at the apex and generally free from the flowering glume and palea. The plant is not found wild, but is believed to be indigenous to the country bordering the Black and the Caspian seas. The granules of rye-starch are larger than those of wheat or barley, some being .0016 of an inch in diameter. The form of the larger ones is that of a flattened disk with a depressed centre having cracks on its outer edge. The hilum is central with lines radiating almost to the circumference.

Rye is harder than wheat and is usually cultivated in cool regions on sandy or light soils, and in the Eastern States on medium loams which have become physically or chemically defective and will not produce satisfactory wheat crops. It will thrive on reclaimed peaty soils. In the rotation, rye occupies the same place that wheat would, and, like the latter, prefers a fine

RYE-GRASS — RYE-HOUSE PLOT

firm seed bed. For a grain crop, from $1\frac{1}{4}$ to 2 bushels per acre are usually sown in the autumn. Judicious rolling and harrowing in spring is often beneficial. The crop is harvested just before it is fully ripe, a good yield varying between 15 and 30 bushels of grain and from one to two tons of straw. The straw is particularly tough and pithy and of little feeding value. It takes a long time to rot in the manure heap when used as litter, unless it is chaffed.

Two types of rye are grown, the common or autumn-sown usually grown for grain, and the spring-sown usually sown in spring, but the former may be sown in spring and the latter in autumn. Midsummer or Saint John's Day rye and giant or Tyrolese rye are spring varieties and good for forage, the latter requiring a rich soil. When grown for forage, as a cover crop, or to be plowed in as green manure, three bushels of rye may be sown per acre at various seasons of the year, the only proviso being that there shall be sufficient moisture and warmth present to insure germination and growth. Green rye is an excellent feed, either for soiling or folding in the spring, being well suited for cows in milk or ewes with lambs. As soon as the ear appears the straw becomes tough and woody, so that stock refuse it, hence it should be grown in small areas and a succession put in. A bushel weighs about 56 pounds and each pound contains on an average about 21,000 kernels.

Feeding Value and Uses.—In northern Europe the grain is largely used for bread-making, but in this country it is chiefly employed either in the manufacture of malt and spirituous liquors, as rye whiskey, etc., or as food for stock. Holland's gin and the national Russian drink, kvass, are largely made from rye. The following table shows that rye does not differ materially from wheat in composition, nor are its by-products chemically dissimilar from those of the wheat grain:

Average percentage composition of	Water	Ash	Protein	Crude fibre	Nitrogen-free extract	Ether extract
Rye	11.6	1.9	10.6	1.7	72.5	1.7
Rye flour...	13.1	0.7	6.7	0.4	78.3	0.8
Rye bran...	11.6	3.6	14.7	3.5	63.8	2.8
Rye shorts..	9.3	5.9	18.0	5.1	59.9	2.8

The percentage digestibility of rye meal with ruminants is dry matter 87, protein 84, nitrogen-free extract 92, ether extract 64; while that of rye bran with pigs is dry matter 67, protein 66, nitrogen-free extract 75, ether extract 58.

In milling the outer portion of the rye kernel constitutes the bran, the second layer the "middlings" or "shorts," and the inner portion the flour. For stock the whole kernel is ground. Rye flour is somewhat similar to corn meal as a source of protein and energy, but is more expensive. Ground rye and rye bran are fed to cows in Denmark. Not more than 3 pounds daily should be given, as they are said to have a deleterious effect upon the quality of the butter. Experiments show that for pig feeding rye is of equal value with barley, and that one pound of rye is equal to six pounds of separated milk or twelve pounds of whey; that rye shorts are inferior to rye, the pork from the former being softer and showing more shrinkage. Ground rye

may be safely fed to work horses to the extent of 8 or 10 pounds daily, together with other feeds, as bran or oats. Owing to the hollow stems of rye holding considerable air, this crop is not making much progress for silage purposes.

Rye straw is longer and more uniform in size than that of other grains and when unbroken it is used for packing pottery, horse collars, mattresses, etc., and in the manufacture of a variety of articles, as paper, hats, bonnets, mats, slippers, toys and fancy articles. For such purposes, it often commands a good price.

Diseases.—Ergot (*Claviceps purpurea*) is the chief disease and is common on other gramineæ. The elongated, curved, brownish or purplish spurs of ergot form on the head in place of a kernel and are sown with the seed unless it is carefully screened. If sown, they germinate and finally send out minute spores which, attaching themselves to the grass, live on it parasitically, send out small thread-like growths which finally reach the ovary, where they displace the rye grain and reproduce the cockscur or resting spore. Ergot should be removed before rye is used as feed; it is dangerous to man and beast.

Statistics.—In 1910 the world's crop of rye was 1,675,898,000 bushels and the production of the United States, 33,039,000 bushels, both being almost the high record. In 1910 the leading countries growing rye were Russia, 843,699,000 bushels; Germany, 413,802,000 bushels; Austro-Hungary, 166,372,000 bushels. The average yields per acre for the past eight years are Germany 22.6 bushels; Austro-Hungary 16.1 bushels; United States 15.0 bushels; Russia 11.6 bushels. In 1902 the average yield of the United States was 17 bushels per acre, valued at 50.8 cents per bushel, or \$8.63 per acre. In 1910 the leading States were Pennsylvania, 6,460,000 bushels; Michigan, 5,355,000 bushels; Wisconsin, 4,880,000 bushels; New York, 3,111,000 bushels; New Jersey, 1,530,000 bushels, and Illinois and Nebraska, each over 1,200,000 bushels.

SAMUEL FRASER,

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Rye-grass. See GRASSES OF THE UNITED STATES.

Rye-house Plot, in English history, a conspiracy which took place in the reign of Charles II., and which became famous from the fact that its detection involved the death of Lord William Russell, Lord Essex, and Algernon Sidney, who were in no way connected with it. The immediate object of the Rye-house Plot, which was contrived in 1683 among a number of obscure persons belonging to the party of which those celebrated men were among the leaders, was to assassinate the king and his brother, the Duke of York (afterward James II.), as they returned from the Newmarket races. This plan was to have been executed at a convenient spot on the road from Newmarket to London, where there was a farm called Rye-house, belonging to one of the conspirators name Rumboldt; but the plan was frustrated by the king and his brother happening to return from Newmarket earlier than was expected. Soon after information of the matter was laid before one of the secretaries of state, and it was added that since this plot had been frustrated the plan of a general insurrection had been taken up by various eminent persons, among whom were those mentioned.

A general insurrection had indeed been talked of among the accused persons, and the details and probable success of such a scheme appear to have been considered by them; but there was no evidence whatever to show that the promoters of the wider scheme were in any way involved in the minor plot, which was got up, after the general insurrection had first been talked of, by a few of those who were already concerned in the larger plan. Yet from the way in which the revelations were made to the government the two schemes were completely confounded, and Russell, Essex, and Sidney were arrested on the charge of treason. Essex put an end to his own life in the Tower, and Russell and Sidney were condemned and beheaded. Lieutenant-colonel Walcot, one of the real contrivers of the Rye-house Plot, was at the same time brought to the block.

Ryerson, ri'ér-sôn, Adolphus Egerton, Canadian Methodist: b. Charlotteville 24 March 1803; d. Toronto 19 Feb. 1882. He entered the Methodist ministry in 1825; and became identified with the Methodist Episcopal Church of Canada at the organization of that body in 1828. In 1832 went to England to form a connection with the parent body. In 1842 he became first president of Victoria College and in 1845 was appointed superintendent of education for the province of Upper Canada, a position he retained for 30 years. Besides founding and editing 'The Christian Guardian,' he wrote 'A Manual of Agricultural Chemistry'; 'The Clergy Reserve Question'; 'Compulsory Education.' Consult: Egerton Ryerson, 'The Story of my Life' (1884).

Ryland, ri'lând, Henry, English artist: b. Biggleswade, Bedfordshire. He was trained in art at the South Kensington schools and worked at Paris in the studio of Benjamin Constant, and at Julian's Academy under Boulanger and Lefebvre. His practical professional life was begun by him as a designer of stained glass and he contributed to the 'English Illustrated Magazine' in its early days. His first work as a painter was exhibited at the Grosvenor Gallery, but he has since exhibited, chiefly watercolors, at the other exhibitions of London, and many of his pictures have been engraved.

Ryle, ril, John Charles, English Anglican bishop: b. Macclesfield, Cheshire, 10 May 1816; d. Lowestoft, Suffolk, 10 June 1900. He was educated at Oxford, took orders in the English church, and was successively curate at Exbury, rector of St. Thomas', Winchester (1843), of Helmingham, Suffolk (1844), and vicar of Stradbroke, Suffolk (1861). He was appointed honorary canon of Norwich, in 1872, and in 1880 was nominated Dean of Salisbury, but before he

had taken possession of this post was made bishop of the newly formed see of Liverpool. He was one of the most prominent members of the Evangelical party, and besides publishing numberless tracts which were widely popular, was author of such books as 'Coming Events and Present Duties' (1867); 'Bishops and Clergy of Other Days' (1868); 'The Christian Leaders of the Last Century' (1869); 'Expository Thoughts on the Gospels' (1856-69).

Rymer, ri'mér, Thomas, English critic and antiquary: b. Yafforth, Yorkshire, 1641; d. London 14 Dec. 1713. He studied at Cambridge, subsequently kept terms at Gray's Inn, and was called to the bar in 1673. In 1678 he published 'Edgar, a Tragedy.' In 1692 he succeeded Shadwell as historiographer royal, and was entrusted with the preparation of a collection of public treaties, which he began to publish in 1704, under the title of 'Fœdera, Conventiones, et cujuscunque Generis Acta publica, inter Reges Angliæ et alios Principes.' Of this valuable and learned work he completed 15 volumes, and five more were afterward added by Robert Sanderson. The publication of the whole work was completed in 1735.

Rymer, Thomas, of Ercildoune. See RHYMER, THOMAS THE.

Ryotwar, ri'ôt-wâr, in India, the lease of land by the government officers to the ryots or native cultivators at a fixed rent, a practice chiefly prevalent in the Madras Presidency.

Rysbrack, rüs'bräk, John Michael, German sculptor: b. Antwerp 1693 or 1694; d. 8 Jan. 1770. He went to England in 1720 and made a reputation by the exercise of his art, of which Westminster Abbey and several cathedral churches contain examples, among which may be mentioned the monuments of Sir Isaac Newton and the Duke of Marlborough. He also executed the equestrian statue of William III., at Bristol, and the statue of Locke at Oxford.

Ryswick, rîz'wîk (Rijswijk), Netherlands, a village between Delft and The Hague, famous for the celebrated treaty concluded in 1697, and known as the 'Peace of Ryswick,' signed by France, England, Spain, and Germany. It terminated a bloody war waged by England against France. Louis XIV. relinquished his recent conquests except Strasburg, which was taken in 1681. He also acknowledged William III. king of Great Britain and Ireland.

Rzheff, rzhëf, or Rjev, Russia, in the Tver government, occupies the heights on both banks of the Volga. It is a railway terminus, 89 miles southwest of Tver, and the centre of a great transit trade between the provinces of the lower Volga and the ports of Saint Petersburg and Riga.

S

S the nineteenth letter and fifteenth consonant of the English and several other alphabets, is classed as a sibilant or hissing letter. The sibilant is of two kinds, one produced merely by emission of the breath while the end of the tongue is brought close to the front palate just behind the gums: this is the hard open sound; the corresponding soft open sound is represented in the alphabet by *z*, but in practice is often represented by *s*. The form *S* is the ancient Greek character *ς* with its angles rounded: in the existing Greek alphabet the *s* is represented by *ζ*. In some English words *s* is silent: island, aisle. The final *th* of verbs has changed to *s* because of the nearness of sound of *s* to *th*: loveth, loves; hath, has. There are several words in English—and the like can be said of Greek—which, beginning with *m* or *p* or *l*, take on an initial *s*; melt, smelt; pike, spike; lick, slick; Gr. mikros, smikros: compare Ger. niesen, Eng. sneeze. Sometimes the sound of *s* is changed to that of *st*: the verb hoise becomes hoist, whiles becomes whilst; and there is the mispronunciation of once, onst; and the plural of mouse is mice. The digraph *sh* stands usually for the ancient *sc* (*sk*): Old Eng. sceal, shall, fisk, fish.

S. P. Q. R., the initial letters of *Senatus Populusque Romanus* (the Senate and the Roman people), which was supposed to express the political character of the Latin nation. These initials were carried as a battle standard by the Roman armies.

Sa de Miranda, Francisco de, frân-thês'kô dâ sâ dâ mē-rân'dâ, Portuguese poet: b. Coimbra, Portugal, 27 Oct. 1495; d. there 15 March 1558. He wrote much in Spanish, taking for his models Dante and Petrarch, but in sentiment remained entirely loyal to his native country. His fame rests chiefly upon his poetical epistles and eclogues, though his entire work is excellent, and characterized by sincerity and love of natural beauty. He is ranked as one of the six greatest Portuguese poets. An edition of his work edited by Carolina Michaëlis de Vasconcellos contains 189 of his pieces, 74 of which are in Castilian.

Saadja Gaon, sâ-äd'yä gä-ôn' (SAADJA BEN JOSEPH, Arab SAM), Jewish Rabbīn: b. Fayum, the Biblical Pithom, Egypt, 892; d. Babylonia 941. In 828 he was appointed Gaon or principal of the Jewish Academy at Sura, near Babylon, into which dwindling institution his zeal and learning infused new blood. His acquirements were many and varied, and he lived in a time when philosophy and reason were in danger of usurping the authority hitherto wielded by tradition, and especially were the Karaites inclined to

discard the latter. It was the work of Saadja to discover a common ground for the maintenance and support of Jewish dogma side by side with philosophical theory. This was the object of his great work, written in Arabic, 'Emunot w'deot' ('Faith and Ethics') which was translated into Hebrew by Juda ibn Tibbon (1160) and into German by Fürst (1845). Saadja wrote a commentary to some of the books of the Old Testament, treatises on grammar, and hymns for the synagogue. On the 1000th anniversary of his birth a complete edition of his works was published by Joseph Derenbourg. Consult Grätz, 'Geschichte der Juden' (1870); Guttman, 'Die Religionsphilosophie des Saadja' (1882).

Saale, zä'lë, Germany, the name of several rivers, flowing between Baireuth and Hof, in the northeast of Bavaria. The most important of these is the river rising in the north side of the Fichtelgebirge at an altitude of 2,390 feet. It is navigable from Naumberg and passes Kahla, Jena, Kainburg—it becomes very circuitous, passing Merseburg and Halle, and finally connects with the Elbe, near Leipsic, by canal. It flows through a fertile and picturesque valley for 200 miles, its romantic heights crowned by many castles. It is of great commercial value, having a wide and deep channel in the greater part of its length.

Saarbrücken, zär-brük-ën, or **Sankt-Johann Saarbrücken**, Germany, in the Rhine province, Prussia, is situated on the Saar, 39 miles southeast of Treves. Its sister-town across the river gives the town the double name. It is an important industrial centre, is well-built, and has a castle. There is a mining academy and a monument to Bismarck. The principal industries are wool-spinning, brewing, and the manufacture of tobacco, chemicals, tin, and stoneware. Trade is mainly dependent on the coal mines, the glass and iron works of the district. In 1870 the French and Prussian forces fought here the first engagement of the Franco-German war resulting in a partial victory to the French, which the Germans retrieved four days later by their first victory in the vicinity. Pop., including Sankt-Johann about 47,000.

Saba, sâ'ba, one of the Leeward Islands, Dutch West Indies, area five square miles. It is high and rocky, rising abruptly from the sea to a height of nearly 3,000 feet. A small proportion of the area is under cultivation; the chief products are tropical fruits and vegetables, especially cabbages, and cotton. Fishing is also an important industry, and fishing boats are built on the island. The inhabitants are the descendants of Dutch and Scandinavian pirates who occupied the island in the 17th century. The

island nominally belongs to Holland, but the people are practically independent, being exempt from taxes and electing their own governor. Pop. about 3,000.

Sabadilla, or **Cevadilla**, the pharmaceutical term for seeds of a liliaceous plant (*Schænocaulon officinale*), growing in Central America, with a bulbous root, grass-like leaves and a flower-stalk some six feet in height. The papery, tri-capsular fruits contain a few pointed, wrinkled, blackish seeds, persistently acrid and sternutatory, a powerful irritant and poisonous. They are employed for preparing veratrine, which in the form of a tincture or ointment, is used as an external application for neuralgia and rheumatism, but is likely to prove poisonous if the skin be broken, thus permitting absorption. Sabadilla has also been given as a dangerous vermifuge, and is used for killing vermin.

Sabæanism, sā-bē'an-izm, or **Sabianism**, a religion whose believers were once numerous in Arabia, Syria and Mesopotamia, which while it recognized only one supreme being, also worshipped, or paid high reverence to angels, or inferior divinities, supposed to reside in the stars. This part of the Sabæan creed virtually amounted in practice to star-worship.

Sabæans, sā-bē'an-z, the ancient name of the inhabitants of the modern Yemen, in Arabia. Ptolemy places them in the north and middle of what is now called Yemen, and earlier geographers to the south of that province; but the fact appears to be that they were a race dwelling on both sides of the Red Sea on its southern shores, in Arabia and Ethiopia. The names applied to the peoples dwelling on the different sides of the Red Sea were very like, Shebaim being that of the Arabian section, and Sebaim that of the Ethiopian. The country of the Shebaim was probably the Sheba of the Bible, the land of the queen who came to visit Solomon. It was fertile and rich in spices and perfumes, and carried on an extensive trade with the East.

Sabaism, the name derived from Hebrew and Arabic, given to the worship of the stars as deities. It extended through the countries of the Assyrian and Medo-Persian empires as far as Asia Minor, between the Caspian Sea, the Euxine, and the Mediterranean, from the Armenian Mountains as far as the banks of the Nile and southern Arabia; but it assumed different forms in different countries, appearing sometimes more sensual, sometimes more spiritual. The objects of worship were the sun, the moon, and the planets, or rather the planetary spirits of which the planets were believed to be the frame or the body. The worship of the sun was especially cultivated in Babylon and Phœnicia. The worshippers of the stars generally ascribed to them a great influence upon and a knowledge of terrestrial affairs; and astrology, the casting of nativities, and various systems of demonology, were therefore the natural result of Sabaism. The astrological system was most largely developed by the Egyptians, while Parseeism was the purest and most perfect form of Sabaism. In the Koran the star worship of ancient Arabia is designated by the name Sabaism. In the town of Haran, in Mesopotamia, a kind of Sabaism maintained itself, surrounded on all sides by Christianity, until the Middle Ages. One sect of Sabæans believed in the migration of the

soul, and in great world-periods, constantly renewed in an everlasting revolution, a view sustained to a certain extent by modern philosophy.

Sa'bal, or **Cabbage Palmetto**, the most northern arborescent palm in the world. It is a tree attaining 80 feet in height. Until it is from 10 to 20 feet high, its straight, robust stem is surrounded by the dry fibrous sheaths, and the stubs of petioles, of leaves, projecting like spines, and giving a very picturesque and characteristic appearance. The leaves, massed at the top of the trunk are cordate, or fan-shaped, narrowly pinnatifid, each division cleft at its apex and recurved at the summit. The terminal bud, by which growth is continued, or "cabbage," is a favorite delicacy with the negroes, who cut it out of the young and healthy trees,—thereby causing the ultimate death of the palmetto—and cook it as a vegetable. Many palmettoes are killed by the removal of the tops of the young trees. These tops are sent to factories, where they are trimmed down to a disk some eight inches thick, the soft central parts are cut out, and the disk is then boiled to loosen the fibres of the sheaths and petioles, which are made into scrubbing brushes. These buds for brushes are worth only about 6 or 7 cents apiece, and yet the trees are being exterminated for so slight returns. The mature leaves are used for thatching, and the trunks resist teredos to such an extent that they are valuable for sub-marine pilings.

This palmetto has always been interwoven with the history of South Carolina, the "Palmetto State." A fortification, or stockade, on Sullivan's Island in Charleston Harbor, 1776, was composed of earth and palmetto logs, and succeeded in repulsing the attacking British fleet under Sir Peter Parker, whose shot had practically no effect on the wall, for they could not split the spongy trunks, but were imbedded in them. Therefore, in memory of this event, the palmetto tree appeared on the seal of South Carolina, over an uprooted branchless oak-tree representing the oaken ships of England; on a flag adopted after the Ordinance of Secession (1861) was passed; and also on a medal. At the signing of the secession ordinance, palmetto trees flanked the platform, and at the back was the banner of the convention, bearing among other curious devices, a most unnatural palmetto, with a gigantic rattlesnake wound about its trunk. Cockades, rosettes of blue ribbon with a palmetto imprinted on a button in the centre, were worn by Charlestonians in 1860-1.

Sab'alo, a name of the tarpon (q.v.), further known as savalle, savanilla, grande ecaille, silver-king, etc.; also of the Hawaiian milk-fish (*Chanos chanos*).

Sabaoth, sãb'ã-õth, or sa-bã'õth, Lord God of, a term used in the Scripture, meaning "Lord God of Hosts." It has no connection with the word Sabbath.

Sabatier, sã-bã-tê-ã, Paul, French theologian and historian: b. Saint-Michel-de-Chabreilanoux, Ardèche, 3 Aug. 1858. He was educated in the theological faculty of Paris, and in 1885 became vicar of the French parish of Saint Nicolas at Strasburg. The German government offered him a superior appointment, involving his becoming a German citizen; he requested to be allowed to retain his post as vicar, but the request was viewed as a political manifestation, and he was banished the coun-

try. For a brief time he was pastor of Saint Cierge la Serre; then he withdrew from the ministry to devote himself wholly to historical studies. His chief work is 'La Vie de Saint François d'Assise' (1893), based largely on previously unutilized documents discovered by him in various Italian archives. Within a year from the appearance of the first French edition, editions had appeared in almost all Continental languages, including Swedish and Polish. The Russian version was prepared under the direction of Tolstoi. Sabatier published also 'La Didaché ou l'Enseignement des Douze Apôtres' (1885), and editions of the 'Speculum Perfectionis' by Leo of Assisi (1898; translated into English by S. Evans as 'St. Francis of Assisi, the Mirror of Perfection' (1898), and of the 'Tractatus de Indulgentia' (1900), of Francisus Bartholus. Consult article by Rawnsley in 'Contemporary Review, V. 74, pp. 505-18 (1898).

Sabazius, sa-bā'zhi-ūs, a Phrygian divinity, identified by the Greeks in part with Zeus and in part with Dionysus. His symbol was a serpent. His worship extended to Greece, and was found also in Italy, especially in late pagan times. He was said to have been the first to employ oxen for plowing.

Sabbatai Zevi, sâb-bâ-ti' zē-vē', whose name is also spelled "Sabtai Zefi" and Sabbathais Zevi, a pretended Messiah: b. Smyrna 1641. He was a man of great learning and magnetic presence, and he led thousands of followers, mainly in Smyrna, Salonica, Alexandria, and Jerusalem, to believe in him as the Messiah. In 1664 he had about 80,000 followers; in the following year the beginning of the Messianic reign within a few months and the rebuilding of the Temple in the next year were proclaimed in the streets of Alexandria by Sabbatai and six disciples, clad in white raiments, with garlands on their heads. Having excited serious alarm at Constantinople, he was apprehended at Smyrna, and terrified into a recantation of his mission. He was said to have declared that his sole object had been to embrace Islam, and to carry over all the Jews with him. The sultan declared himself satisfied, and honored him with the title of an effendi, giving him an honorary post at the same time. He again aroused the jealousy of the Turks, and was either poisoned in prison, or publicly executed.

Sabbatarian Controversy, the dispute in various forms between those who urge and those who oppose a rigid observance of Sunday. It has been going on from the time of King James I., of England, who favored Sunday sports, and thereby offended many of his subjects, and it has in late years included proposals to throw open to the public museums, libraries, and galleries, and other places of recreation and instruction, on the first day of the week. Most of these changes have been generally adopted. The proposition to permit the sale of alcoholic liquors in saloons on Sunday is at present the chief feature of the Sabbatarian Controversy.

Sabbatar'ians, a term applied to those who urge rigid observance of Sunday. It was applied also in earlier times to the sect now known as Seventh Day Baptists, who observe Saturday for Sunday, and who, for that reason, are permitted in Rhode Island, where they are comparatively numerous, to work on Sunday.

Sabbath, the ancient Hebrews' weekly day of rest. In Hebrew the word means week, and the expression of Josephus (Apion ii. 2), who explains it as meaning "a rest from all labor," is rather to be looked upon as a commentary than as a derivation etymologically correct.

The Sabbath was the seventh day of the Hebrew week and lasted from sunset on Friday to sunset on Saturday. It was celebrated as a holy day; a day of rest and rejoicing; by ceasing from all labor, and by causing servants, strangers, and cattle to cease also. Plants even were to rest; they were neither to be sown nor reaped on that day. The services of priests and Levites in and about the tabernacle and temple were, however, to be performed through the Sabbath-day. Circumcision, too, could take place on the Sabbath, when it fell on the eighth day after the birth of a male child.

Profanation of the Sabbath was punished by stoning to death. It was not until after the exile that the character of the work by which the Sabbath could be profaned was strictly defined. In the law only one act of labor was specifically prohibited, that of lighting a fire for the purpose of cooking. According to Josephus armies never proceeded on their march on the Sabbath. The Pharisees forbade even the plucking of grains of corn on that day; the healing of a sick man; or the walking of a cured patient bearing his bed. According to the Mishna even a broken bone was not to be set, nor dislocations poulticed or bound up on that day.

Origin of the Sabbath.—The Sabbath appears to have been an institution of religion long prior to Moses. It is sometimes said that it was borrowed by him from older nations, such as the Egyptians. Such Latin writers as Seneca and Ovid give intimations that the veneration for the seventh day had found some favor among the early Romans. It seems more natural to suppose that it had come down with the old traditions of theocratic religion which are found embalmed in the first chapter of Genesis. The poem of the creation, in which God is related to have created the world in six days and rested on the seventh day, embodies a tradition much earlier than the period of Mosaic legislation. There are several intimations in the patriarchal age that the followers of Jehovah, such as Abraham and Isaac, chose certain times for rest, meditation, prayer and sacrifice to God. In after times it would almost seem as if the poem or hymn of the creation was used as a special part of Sabbath-day devotions. On that day the people were called to reflect upon the fact that the whole universe, including themselves, had an origin in one personal and supreme Being; that He had exerted His Omnipotence for a definite period and then had ceased from His work. They were constantly to remind themselves of the work of God, once for all completed, by their own six days' round of labor; and as God had rested from His work so were they to rest from theirs and to turn their thoughts toward Jehovah "who had done so great things for them."

Mosaic Ordinances of the Sabbath.—The scope and meaning of the Sabbath-day was very much extended and amplified by the provisions of the law as contained in the Hexateuch. It was made to be a day on which not only the finished task of creation was to be commemorated, but on which the great providential deliv-

SABBATH

erances of the children of Israel were likewise to be recalled. But first of all the command is given by the law in various forms of speech, but with the same intent throughout the books of the law, Exodus, Deuteronomy, and Leviticus, to remember the seventh day, the Sabbath, to keep it holy; most specifically in Lev. xxiii. 3: "Six days shall work be done: but the seventh day is the sabbath of rest, an holy convocation; ye shall do no work therein: it is the sabbath of the Lord in all your dwellings."

First of all there are three specifications as to the manner in which the week is to be spent: (1) by labor—"Six days shalt thou labor, and do all thy work:" (Ex. xx. 9); (2) by rest on the seventh day; on this day the people are ordered to rest, literally to take breath, then are enumerated in detail those who are enjoined from work: "Thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor the stranger that is within thy gates." The penalty of death is threatened against all who shall disobey this command. The reasons of this command are given: (1) as a counsel of mercy—"Six days thou shalt do thy work, and on the seventh day thou shalt rest, that thine ox and thine ass may rest, and the son of thine handmaid, and the stranger, may be refreshed" (Ex. xxiii. 12); (2) as a commemoration of the deliverance from Egypt—"And remember thou wast a servant in the land of Egypt, and that the Lord thy God brought thee out thence through a mighty hand and by a stretched out arm, therefore the Lord thy God commanded thee to keep the sabbath day" (Deut. v. 15); (3) as a commemoration of the finished creation "For in six days the Lord made heaven and earth, the sea, and all that in them is, and rested the seventh day: wherefore the Lord blessed the sabbath day, and hallowed it" (Ex. xx. 11); (4) as a sign of the covenant, just as circumcision was the sign of the Abrahamic covenant, and the rainbow the sign of the covenant with Noah—"Speak thou also unto the children of Israel saying, Verily my sabbaths ye shall keep, for it is a sign between me and you throughout your generations, that ye may know that I am the Lord that doth sanctify you. . . . It is a sign between me and the children of Israel for ever: for in six days the Lord made heaven and earth, and on the seventh day he rested, and was refreshed" (Ex. xxxi. 13, 17).

The Jews of to-day who profess to keep up the tradition of their fathers still keep the Sabbath as a joyful festival. The Sabbath is held from Friday evening to Saturday evening. It is among some of them considered a pious observance to begin the celebration half an hour before Friday's sunset and to continue it half an hour after sunset on Saturday for the benefit of the souls of those who are in torment, for they believe that the damned are allowed a mitigation of their suffering during the feast. On Friday afternoon all the food for the following day is prepared, and their festal array is laid out for the Sabbath. Some Jews have special raiment which they wear only on that day; on the morning of which the Sabbath lamp is lit and the Sabbath bread laid on the table. The master of the house at the close of the evening meal blesses the wine and passes it round. They eat three meals on the Sabbath-day and they

have a maxim that it is good to honor the day in the body, in dress, in eating, and in drinking.

The Lord's Day.—A careful consideration of early Church history and early Church writers leads to the conclusion that the day of Christ's resurrection, the first day of the week, grew up, coeval with the existence of Christianity itself, as the one distinctively Christian festival, which was made to fall in with the injunction to periodical rest, founded on the earliest traditions of biblical religion and provided for under Moses by special legislation for the observance of the Sabbath. Nevertheless the idea of the Lord's Day is wholly distinct from that of the Sabbath, which seems to have been likewise observed by the early Church, although sometimes as a fast. The Saturday half-holiday, which still survives in some countries or at some seasons of the year, is certainly derived from this double observance. The tendency to sabbatize the Lord's Day was perhaps due to certain imperial decrees of the Christian emperors beginning with Constantine, who closed the law courts, etc., on what Justin Martyr calls "the day of the sun," and what Constantine speaks of as "venerable Sunday."

Civil legislation on behalf of the observance of Sunday began in the Roman empire in an early part of the 4th century, as in the statute of Constantine (321), which runs as follows: "On the venerable day of the sun let all magistrates and people residing in the city rest, and let all workshops be closed. In the country persons engaged in agriculture may, however, according to their will and without violating this law, continue their toil, for often another day is not so suitable either for sowing grain or for planting vines; and if the proper opportunity for such operations be lost the bounty of heaven may be disappointed." While Constantine permitted the legal freeing of slaves and the visitation of captives on Sunday, he prohibited the prosecution of lawsuits. Theodosius (386) published a decree suspending the theatrical shows and circus races on Sunday. These historical facts are important as bearing on the present Sunday laws in England and America.

The Frank emperors kept up the observance of the Lord's Day by their capitularies or general statutes; and even during the French Revolution, when the Christian calendar was abolished, each tenth day was made a day of rest, and public offices, schools, workshops, and shops of merchandise, excepting those of food and medicine, were ordered to be closed. The Code Napoléon ordered the observance of Sunday.

In England the observance of the Lord's Day has been enjoined by statute from the earliest times. Canute (1028-35) prohibited marketing, hunting, and the holding of local courts on that day. After the Conquest the conduct of the people with regard to trade, sports, and the law courts was controlled by special statutes.

The most important legislation on the subject of Sunday usage is that which was promulgated in the reign of Charles II. (1676). By the law then passed a prohibition is imposed upon all worldly labor or business excepting works of necessity or charity, necessary traveling and the service of any legal writ excepting in case of high treason or treason, felony, or breaches of the peace; and it permits also the sale of food in inns and eating-shops.

SABBATIA — SABIN

The American colonists, especially in their early New England settlements, enforced the observance of the first day of the week by the most rigorous penalties. People were compelled by the laws of Massachusetts, Connecticut, Georgia, South Carolina and Virginia to attend public worship in a church or conventicle. It was only as time advanced that a distinction was made between the observance of Sunday as a civil and as a religious institution. (See SUNDAY.) Consult: Hessey, 'Bampton Lectures' (1860); Oehler, 'Theology of the Old Testament'; Proudhon, 'La Célébration du Dimanche'; Briggs, 'The Higher Criticism of the Hexateuch' (1893).

Sabbat'ia, a genus of *Gentianaceae*, often growing in sand or salt marshes. These plants have verticillate leaves, handsome terminal flowers, with white or pink rotate corollas 5 to 12-merous; 4 to 12 stamens with thread-like filaments, and two-cleft styles, capsules more or less globose, coriaceous, and containing many small reticulated seeds. Several species have a tonic, although bitter, juice, and are used as febrifuges. Although named in honor of an early Italian botanist, Sabbati, the genus is said to be so called because the Pilgrim Fathers discovered the local *S. stellaris* on a Sabbath. This charming species, called the marsh pink, or Rose of Plymouth, bears a very delicate pink flower, with a star-shaped yellowish eye.

Sabbat'ians. See JEWISH SECTS.

Sabbat'ical Year, the seventh year which the law of Moses provided should be a year of rest for the land (Ex. xxiii. 10, 11; Lev. xxv. 1-7). The land was not to be sown and that which grew of its own accord was not to be reaped, but to be left for the poor to eat. Vineyards and oliveyards were also to be left uncultivated, and their produce ungathered; but the people were allowed to fish and hunt, and attend to their bees and flocks, and a triple produce was promised for every sixth year to make up for the deficiency of the seventh. The sabbatical year was also to be a year of release for Jewish debtors (Deut. xv. 1-6), but those who were able to lend were strictly enjoined not to refuse loans to poor and needy persons because the year of release was at hand (Deut. xv. 7-11). In this year also the law was to be read solemnly to all the people assembled at the feast of Tabernacles (Deut. xxxi. 10). This institution seems to have been almost entirely ignored during the period which preceded the captivity, and in 2 Chron. xxxvi. 21, the time of the captivity is represented as one in which the land was enabled, by the will of God, to enjoy the sabbaths or years of rest that the Israelites had omitted to allow it. After the captivity Nehemiah sought to secure the better observance of the septennial sabbath, as he did that of the weekly sabbath (Neh. x. 31), and he seems to have had some success in the former as well as in the latter effort. The historic fact that Alexander the Great remitted the Jewish tribute in the seventh year because the Jews were debarred by their religion from employing the means of raising it, shows that it was observed a hundred years after the time of Nehemiah.

Sabel'la, a genus of annelids dwelling on sandy shores in tubes formed solely of sand, the

particles of which are glued together by means of a natural cement secreted by the worms, and thus form a smooth regular tube, presenting a striking contrast in its uniformity to the rougher dwelling-tubes of allied genera, such as *Terebella*. The worm itself possesses a slender body, the hinder part of which may be doubled up within the tube. The head is provided with slender tentacles.

Sabel'lianism, the theological views of Sabellius (q.v.), which, though they had numerous advocates, were condemned by the Church as heretical. See MONARCHIANS.

Sabellius, sa-bél'ŭ-s, Christian teacher: b. Pentapolis, Africa, or Italy. He taught at Ptolemais in Upper Egypt during the pontificate of Zephyrinus (199-217) and Calixtus I. (217-222), and is known as the founder of a sect who considered the Son and Holy Ghost only as different revelations or manifestations of the Godhead, but not as separate persons (see MONARCHIANS). The doctrines of Sabellius were opposed by Dionysius of Alexandria and Dionysius of Rome, by Epiphanius (who states that the Sabellians were very numerous around Rome and in Mesopotamia), and by Theodoret. Saint Augustine states that by the beginning of the 5th century they had entirely disappeared. Yet their views have always found adherents, and even now some theologians attempt to reconcile theology with reason by admitting conceptions of the Trinity coinciding with that of Sabellius.

Sa'bians. See SABÆANS.

Sabin, sā'bĭn, Edwin Legrand, American writer: b. Rockford, Ill., 23 Dec. 1870. He was graduated from the University of Iowa in 1892, and has published: 'The Making of Iowa' (1900); 'The Magic Mashie' (1902); etc.

Sabin, Joseph, American bibliophile: b. Braunston, Northamptonshire, England, 9 Dec. 1821; d. Brooklyn, N. Y., 5 June 1881. After apprenticeship to Charles Richards, bookseller of Oxford, he set up a bookshop of his own there, but in 1848 came to this country, where he conducted establishments for the sale of old and rare works in New York 1850-6, in Philadelphia 1856-60, and New York 1860-81. His bibliographical knowledge was wide, and he is said to have crossed the Atlantic not less than 25 times for the purchase of unique specimens. From 1869 he published for a number of years 'The American Biblioplist.' He also prepared several compilations, among them 13 volumes of an uncompleted 'Dictionary of Books relating to America.'

Sabin, Oliver C., American Evangelical Christian Science bishop: b. Knox County, Ohio, 1840. His parents were members of the Christian Church, or Disciples of Christ. After the war he studied law and practised his profession for many years, was also engaged in journalism and publishing, and interested himself in politics. After being connected with business enterprises in Illinois, Nebraska, and elsewhere he settled in Washington, D. C., where, in 1899, after a thorough investigation of the Christian Science methods of healing, he with others organized the Evangelical Christian Science Church, the work of which has since prospered and spread rapidly. He relinquished his various business positions and began to

SABINE—SABINE CROSS ROADS

preach the Gospel with voice and pen most successfully.

Sabine, sãb'ın, Sir Edward, English physician: b. Dublin, Ireland, 14 Oct. 1788; d. Richmond, Surrey, 26 June 1883. He was educated at the military colleges of Marlow and Woolwich and in 1803 entered the army where he was commissioned 2d lieutenant of artillery. He served in the war with the United States in 1813-4 and accompanied Ross and Parry in their Arctic expedition in 1818 and that of Parry in 1819-20. While on these expeditions he engaged in researches in terrestrial magnetism and in 1821-5 conducted a series of voyages extending from the Arctic regions to the equator, gathering data concerning the magnetic needle, the figure of the earth and other points in meteorological and terrestrial physics. He was instrumental in the establishment of permanent magnetical and meteorological observatories, retaining directorship of those in the colonies for many years. In 1818 he was elected to the Royal Society, was its vice-president in 1850 and in 1861-71 acted as its president. He received rank as lieutenant-general in the army in 1859 and was retired with full rank as general in 1874. His works include: 'An Account of the Experiments to determine the Figure of the Earth' (1825); 'The Variability of the Intensity of Magnetism upon Many Parts of the Globe' (1838); etc.

Sabine, sã'bin, Lorenzo, American historian: b. New Libson, N. H., 28 Feb. 1803; d. Boston, Mass., 14 April 1877. He sat in the New Hampshire legislature for three successive terms, but removed to Massachusetts in 1849, and was a Whig member of Congress in 1852-3. He is best known for his important work on 'The American Loyalists, or Biographical Sketches of Adherents to the British Crown in the War of the Revolution' (1847). He also published 'Life of Preble' (1847); 'Reports on the Principal Fisheries of the American Seas' (1853); 'Notes on Duels and Duelling, with a Preliminary Historical Essay' (1856); etc.

Sabine, sã'bin, Mountains, Italy, a branch of the Apennines, near the border of ancient Latium, east of Rome, is a lofty group in the upper valley of the Aternus; the highest summit reaches an altitude of about 4,200 feet.

Sabine, sa-bën', a river of the United States, which has its rise in the northeastern part of Texas, in Hunt County, flows southeast about 250 miles, then turns southward and forms the boundary between Texas and Louisiana, and enters the Gulf of Mexico through Sabine Lake and Sabine Pass. The mouth of the river is Sabine Pass, a narrow channel which is obstructed by a muddy bar. Considerable has been done to make this Pass safe for navigation; jetty-building and dredging was begun as soon as the interior of Texas, near the Sabine River, was settled. Sabine Lake is an expansion of the river, but the Neches River also enters the lake. The Sabine River is about 500 miles long and is navigable in its lower course.

Sabine Cross Roads, Battle of, and Banks' Retreat to Alexandria. Three miles southeast of Mansfield, De Soto Parish, La., one of the main roads from Alexandria to Shreveport is crossed by a road from Red River

to Sabine River. At this crossing was fought a battle which marked the culmination and failure of what is known as the Red River Expedition. On 23 Jan. 1864 Gen. Banks, then at New Orleans, received a despatch from Gen. Halleck, dated the 4th, proposing an expedition, to consist of the forces of Banks, Steele, and such as could be spared by Sherman, for the capture of Shreveport, La., on Red River, and the recovery of Texas, thus opening access to the cotton of that section and stimulating trade. Banks had, on a previous occasion, for sound reasons, objected to such a campaign, but now acquiesced and promised a cordial co-operation; but he set forth the difficulties in the way, and made suggestions to remove them, not one of which was regarded. Engrossed with duties concerning political affairs in Louisiana, which had specially been confided to him by the President, Banks could not immediately leave New Orleans, and he entrusted the arrangements of the expedition to Gen. W. B. Franklin, his second in command, who was to move from the Teche 5 March, reach Alexandria on the 17th, and co-operate with a strong fleet under command of Admiral Porter. Porter arrived at the mouth of Red River on 7 March, with a fleet of 15 ironclads and four light steamers, and there he was joined some days later by transports from Vicksburg, carrying four divisions of Sherman's army, under Gen. A. J. Smith, and the Marine brigade of Col. Ellet. A part of the plan of campaign was that Gen. Steele, with an army of 15,000 men, should move from Little Rock, Ark., directly on Shreveport; but Steele, after marching from Little Rock to Camden, was checked, fell back to Little Rock, and took no further part in the campaign. (See JENKINS' FERRY, BATTLE OF.) Smith's forces advanced, attacked and in conjunction with the navy, 14 March, captured Fort de Russy, up Red River, together with 283 prisoners, 10 guns, and many small arms, the Confederate covering force of 3,500 men, under Gen. Walker, after burning two steamboats and a considerable quantity of cotton, retreating up the river. It was not until the 19th that Franklin, with very little opposition, which was brushed aside by his cavalry, reached Alexandria; Banks joined him on the 24th, but his entire column did not close up until the 26th. Meanwhile Gen. Mower, with three brigades of Smith's division and a cavalry brigade of the Nineteenth corps, marched from Alexandria on the 21st for Henderson's Hill, 25 miles westward, surprised the 2d Louisiana cavalry, and with slight loss captured 250 men, nearly as many horses, and four guns, with their caissons. Near Alexandria the fleet came to a series of rapids, and the water was so low that the ironclads could not run up them, but after a week's hard labor the lighter ones were carried over. The transports, which could not pass, returned to Vicksburg, and with them Ellet's 3,000 men. The withdrawal of the transports made it necessary to establish a base at Alexandria and the use of a wagon-train to carry the supplies, and the further necessity of leaving a guard of nearly 4,000 men (under Gen. Grover) to protect the place. Gen. Franklin, with the main column, advanced on the road running west of and parallel to the river, to Natchitoches, about 80 miles above Alexandria, driving before him the Confederate cavalry, and reaching Natchitoches on 3 April, where he was

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joined by A. J. Smith's column, which, accompanied by Porter's fleet, had come to Grand Ecore, four miles from Natchitoches. Porter had a fleet of 13 gunboats and 30 transports.

Banks' army, on the eve of march from Natchitoches for Shreveport, was composed of two divisions of the Thirteenth corps, under Gen. T. E. G. Ransom; five brigades of the Sixteenth corps, under Gen. A. J. Smith; Gen. W. H. Emory's division, three brigades, of the Nineteenth corps; and Col. Dickey's brigade of colored troops, under Gen. Franklin; Gen. A. L. Lee's division of cavalry and mounted infantry, four brigades; and a small artillery reserve, under Capt. Closson. These numbered 31 March 25,735 officers and men, with about 65 guns. Lee's cavalry force of 4,500 men had pushed out westward, 12 miles; on 2 April it ran across Confederate cavalry, drove it back eight miles, and then withdrew to wait for the general advance. The general advance began on the morning of the 6th, led by Lee's cavalry, followed by the two small divisions of the Thirteenth corps, under Ransom, and by Emory, with a division of the Nineteenth corps and Dickey's brigade of colored troops. On the morning of the 7th A. J. Smith followed with Mower's division of the Sixteenth corps. A division of the Seventeenth corps, 1,730 strong, under Gen. T. Kilby Smith, remained with the transports, under instructions to conduct them to Loggy Bayou, opposite Springfield, about midway between Natchitoches and Shreveport, 110 miles by the river, above Grand Ecore, where he was to halt and communicate with the army at Sabine Cross Roads, 54 miles from Grand Ecore. Porter, Smith, and the transports, with six gunboats carrying 17 guns, started on the 7th.

Lee's instructions from Gen. Franklin were to attack the enemy wherever found, but not to bring on a general engagement. On the 7th he drove a brigade of Gen. Green's beyond Pleasant Hill, and came upon a strong force under Green at Wilson's Farm. Lee attacked and after a hard engagement of two hours drove Green to Saint Patrice's Bayou, eight miles from Pleasant Hill. Here Lee bivouacked for the night, and sent back for infantry support. His loss had been 53 killed and wounded. Green's loss was greater, including about 100 prisoners. That night Franklin reached Pleasant Hill; A. J. Smith's division was still a day's march in rear of Franklin. At daybreak of the 8th Lee, having been reinforced by one of Landram's brigades of the Thirteenth corps, dropped his wagon-train, and, moving forward, drove the Confederates from Saint Patrice's Bayou and gradually pushed them to a wood beyond a clearing at Sabine Cross Roads, and found himself in the immediate front of Gen. R. Taylor's army of 10,000 men. Taylor, whose forces had been much scattered, in Arkansas, Louisiana, and Texas, had concentrated them, and near Mansfield had the three divisions of Gens. Green, Walker, and Mouton—10,000 men. On the morning of the 8th he moved three miles from Mansfield to Sabine Cross Roads and formed line in the edge of a wood, commanding, on both sides of the road, a clearing about 1,200 yards long, and 800 wide, through the middle of which was a deep ravine. He knew that Banks' column was stretched out on a single road for more than 20 miles, and was sanguine of success in

attacking the head of it. Lee threw out a strong skirmish-line and waited for Banks' main body to come up. At noon Ransom arrived with a brigade, and line was formed. Banks rode up a little past noon, and sent back repeated orders for Franklin to hurry forward. After heavy and continuous skirmishing, lasting until 4.30 P.M., Taylor threw his entire force of 10,000 men heavily upon the Union line; Mouton's division and two brigades of dismounted cavalry made an impetuous charge upon the Union right, in which Mouton was killed at the first onset, while Walker's division and a brigade on its right fell upon the centre and left of the line. For nearly an hour the men (not over 4,500) of Banks' command resisted this attack, and then were compelled to fall back to the woods in rear of the open space at the cross roads, with heavy loss, including three guns. Franklin had come up with Cameron's division of the Thirteenth corps, and a new line was formed, to be immediately broken by heavy attacks on both flanks and front. The Confederates were gaining the rear, and the Union line was pressed back along the narrow forest road filled with wagons and mules of the supply-train, stragglers, and camp-followers, which so blocked the way that an orderly retreat was impossible. Soon a panic set in, the cavalry train of 156 wagons was captured; Ransom's ten guns were taken, along with 1,000 of his men; Franklin and Ransom were wounded; some of the best officers were struck down; and in spite of the heroic efforts of Banks and others to rally them, nearly the whole army broke into a disorderly retreat, which was checked only at Pleasant Grove, three miles from the field of battle. Here Gen. Emory, with his division, had come up at 6 P.M., and formed line in the edge of a wood, on a ridge overlooking a small stream; and scarcely had his line been formed when the panic-stricken fugitives came rushing back through it to the rear. The Confederates were close on their heels, made an immediate assault upon Emory, and were met with a severe fire delivered at close quarters that instantly checked them. After an hour and a half of fierce battle, in which they made desperate efforts to turn Emory's right, the Confederates were everywhere repulsed with great loss, but held the shores of the stream. Banks' army, after having advanced to within two marches of Shreveport, had been saved from total destruction "by a triumph of valor and discipline on the part of a single division and of skill on the part of its intrepid commander." The action is known as the battle of Pleasant Grove. The Union loss at Sabine Cross Roads and Pleasant Grove was about 1,050 killed and wounded and nearly 1,800 missing; the Confederate loss, 1,500 killed and wounded.

Banks had been limited as to time in carrying out the objects of his campaign. Gen. Sherman was calling for A. J. Smith's troops, and Gen. Grant, who had set his heart on a movement by Banks from New Orleans on Mobile, had written him: "I had much rather that the Red River expedition had never been begun, than that you should be detained one day beyond the first day of May, in commencing the movement east of the Mississippi." The allotted time was fast expiring, and Banks concluded to abandon his expedition. The night of the 8th he fell back 15

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miles to Pleasant Hill, which was reached by Emory's division, that brought up the rear about 9 o'clock next morning. A. J. Smith, with a part of his command, had halted at Pleasant Hill, on the evening of the 8th, and with less than 13,000 men Banks formed a double line; the first, of the Nineteenth corps, along a thickly wooded slope half a mile west of Pleasant Hill; the second, of A. J. Smith's command and the artillery, on a plateau in rear. The trains, preceded by Lee's cavalry and Dickey's brigade of colored troops, and followed by the remnants of Ransom's division, were put on the road to Grand Ecore. Gen. Taylor, reinforced by the divisions of Gens. Churchill and Parsons, had followed Banks very cautiously, and at noon his advance appeared and began skirmishing. Later artillery was brought up and opened fire, and a demonstration was made on the Union right. About 5 P.M. three Confederate divisions charged out of the woods upon the left flank of the Union line, which was steadily driven back up the hill to the cover of the second line. Here the Confederates were repulsed with great loss. Meanwhile the right of the Union line, though hard pressed, stood firm until, the left being driven back, it was nearly enveloped and gave ground, and the Confederates pressed on to an attack on A. J. Smith, who held the second line in reserve. After a short and sharp exchange of fire, Smith's and part of Emory's men made a charge and pushed back the Confederate line. All the reserves were now thrown into action, and the Confederates were routed, driven from the field, and pursued until dark. Gen. E. Kirby Smith, the Confederate department commander, says: "Our troops attacked with vigor and at first with success, but, exposing their right flank, were finally repulsed and thrown into confusion. The Missouri and Arkansas troops, with a brigade of Walker's division, were broken and scattered. The enemy recovered cannon which we had captured the day before, and two of our pieces with the dead and wounded were left on the field. Our troops were completely paralyzed and disorganized by the repulse. . . . Our repulse at Pleasant Hill was so complete and our command was so disorganized that had Banks followed up his success vigorously he would have met but feeble opposition to his advance on Shreveport."

Banks had engaged at Pleasant Hill 12,600 men, of whom 150 were killed, 844 wounded, and 375 missing. Taylor had 14,300 engaged, of whom about 1,000 were killed and wounded, and nearly 500 missing.

Encouraged by his success at Pleasant Hill, Banks gave orders for a forward movement next morning on Shreveport, and preparations were being made for the march, when Gen. Franklin and other officers dissuaded him from it, and it was decided to fall back to Grand Ecore and unite with the fleet. The retreat was resumed during the night and Grand Ecore reached on the 11th. E. Kirby Smith joined Taylor after the close of the battle of Pleasant Hill, and determined to move against Gen. Steele in Arkansas. Taylor withdrew his infantry to Mansfield on the 10th and 11th, leaving the cavalry, under Green, and Polignac's infantry division of 2,000 men to watch and harass Banks. Upon his arrival at Grand Ecore Banks intrenched, threw a pontoon-bridge across the

river, put part of his force on the other side, and waited for the fleet to come down. Porter, with the gunboats, and Kilby Smith, with the transports, had arrived at Loggy Bayou on the afternoon of the 10th, where, two hours later, they received news of Banks' misfortunes, and on the morning of the 11th received his orders to return to Grand Ecore. The fleet turned down stream, but it was not to reach Grand Ecore without opposition. On the evening of the 11th Green, who had been left at Pleasant Hill, started with 750 men and two batteries for Blair's Landing, and on the 12th, with about 500 men and three guns, attacked the fleet and transports as they were running down the river. A brisk fight followed, Gen. Green was killed by a discharge of grape from one of the gunboats, and his men were driven off, with small loss. The Union loss was 57 killed and wounded. By the 15th all the gunboats were back to Grand Ecore, and as fast as the vessels could pass the bar they made their way to Alexandria, one gunboat being lost. The fleet having passed down, Banks marched from Grand Ecore on the 22d for Alexandria, and that night bivouacked at Clouterville, 32 miles from Grand Ecore. The march was resumed on the 22d, and on the morning of the 23d, while marching along Cane River, a branch of the Red, the head of the column was checked at Monett's Ferry by Gen. Bee, with four brigades of 2,000 men and four batteries. Bee's position was a strong one on a bluff commanding the crossing, and on the only practicable road to Alexandria, 35 miles distant. At the same time the Confederate cavalry under Gen. Wharton and Polignac's infantry were harassing Banks' rear. Gen. Birge, with his own brigade and Cameron's division of the Thirteenth corps, in all about 5,000 men, crossed Cane River three miles above the ferry, and by a difficult flank march of several miles reached a hill, the occupation of which rendered Monett's Bluff untenable. Birge attacked at 2 P.M., after a contest of two hours carried the hill, and the Confederates retreated and left open the road Alexandria. The Union loss was 150 to 200 killed and wounded. Banks resumed his march on the 24th, and without further serious opposition entered Alexandria on the 25th. Banks reports that in the 24 days intervening between the march of the army from Alexandria and its return there his own army had marched 400 miles. He had fought several battles, and been successful in all but one, and his losses were 289 killed, 1,541 wounded, and 2,150 missing, an aggregate of 3,980. The difficulty of getting Porter's fleet over the shallow rapids near Alexandria detained Banks at that place until 13 May, when he continued his retreat. (See *YELLOW BAYOU, ENGAGEMENT AT, AND BANKS' RETREAT FROM ALEXANDRIA.*) Consult: 'Official Records,' Vol. XXXIV.; Taylor, 'Destruction and Reconstruction'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

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Sabine Pass, Engagement at. On 6 Aug. 1863 Gen. Halleck informed Gen. Banks, in command at New Orleans, that there were important reasons why the United States flag should be restored at some point in Texas, with the least possible delay. Halleck's despatch was by direction of the Secretary of War, and it

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was understood that the proposed movement was of diplomatic rather than a military character, and intended to prevent European complications. Banks was left to his own judgment to conduct the campaign, but it was suggested that the most feasible route would be by the Red River to Shreveport. Banks, deeming the Red River route impracticable at that season of the year, fitted out an expedition to make a lodgment in Texas at Sabine City, on Sabine Pass, the outlet from Sabine Lake into the Gulf of Mexico, and the terminus of a railroad penetrating eastern Texas, and making connection with Houston, the capital of the State. Gen. Franklin was put in charge of the advance of the expedition of 5,000 men, and was instructed to land a few miles below Sabine Pass, move upon the Confederate works commanding it, and, if practicable, to seize Beaumont, on the railroad to Houston. Four light-draft gunboats, under command of Lieut. Crocker, formed part of the expedition, which sailed from New Orleans on 4 September. Franklin disregarded his instructions to land 10 or 12 miles below Sabine Pass, and on Crocker's representation that he could silence the Confederate works in the pass, he and Crocker arranged for the gunboats to make a direct attack upon the works, drive out the garrison, seize or drive away two Confederate gunboats reported on the river, and then land the troops. From the army 150 sharpshooters were distributed on the four gunboats. Early in the forenoon of the 8th the gunboats and transports crossed the bar at Sabine Pass, and in the middle of the afternoon three of the gunboats opened fire upon the small fort, mounting eight heavy guns, and held by 44 officers and men. The fire was immediately returned, two of the gunboats were disabled and surrendered, and were taken in tow by two small Confederate craft. It was all over in less than an hour. Franklin made no serious attempt to land his troops, but immediately returned to New Orleans, having lost two gunboats, with their 15 heavy guns, nearly 50 killed and wounded, and over 200 prisoners, among them Lieut. Crocker, of the navy. Not a Confederate was hurt. Consult 'Official Records,' Vol. XXVI.

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Sabines, *sā'bīnz* (Latin, *SABINI*, *sā-bī'nī*), a people noted in the early history of Rome, whose territory they adjoined. As a people the Sabines were engaged in agriculture and grazing, and from the simplicity of their lives and their physical prowess they obtained a reputation like that of the Spartans for severity of discipline and sturdiness of character. The narrow limits of the Sabine territory made emigration necessary, and probably in this way they came in contact with the growing power of Rome. They fought the Romans with great courage, but were subdued about 290 B.C., and admitted to Roman citizenship, but not permitted to vote in civic affairs. They became merged in the republic and subsequent empire, and became lost to view as a separate people.

Sabinus, *Masurius*, Roman jurist. He flourished during the reign of Tiberius, and was a pupil of Capito. He was the founder of the school of Sabiniani, and was the author of several works much used and commented upon by

later jurists, the most important being 'Libri iii. Juris Civilis,' which is not now extant.

Sable, one of the fur-bearing animals (*Mustela sibirica*), found in Siberia, Asiatic Russia and Kamchatka, or its American representative (*M. americana*) which differs so little that it is doubtfully named as a separate species. The average length of the sable is about 18 inches, excluding the tail, which is somewhat bushy. The body partakes of the form of the weasels generally, in that it is elongated and vermiform. The fur is smooth, glossy, and may be pressed or smoothed in any direction, owing to the mode of attachment of the hairs to the skin. In color it is a rich deep brown, which near the head may exhibit white markings, and frequently assumes a gray tint about the neck. The fur is heaviest during winter, and the dangers experienced by the sable-hunters from sudden snow-storms obliterating the track, or from the inclement cold, can hardly be overestimated. Sables are for the most part captured in traps, but are cautious animals, and their pursuit is attended with much difficulty. They make their homes in dens or cavities in hollow trees, and produce from three to five young at a birth, the young being born in March or April; and their general habits are those of the marten and weasel, but they are more shy and retiring.

Skins of the Russian sable fetch prices in Liverpool ranging from three to ten guineas. The darkest skins are considered to be the finest. About 2,000 skins annually find their way to England. Most of these furs are used in Russia, where about 25,000 are said to be annually collected. When manufactured for linings sable furs may fetch prices so high as 1,000 guineas. The corporation robes of the London aldermen are lined with this expensive material, and the tails of sables are used in the manufacture of artists' brushes. See FUR-BEARING ANIMALS; FUR-TRADE.

Sable Antelope, one of the largest and most handsome of African antelopes (*Hippotragus niger*), of the same genus as the roan antelope, blaubok, and others, and like them rapidly approaching extinction, as civilization more and more encroaches upon the plains of southern and eastern Africa. Its coat is a deep glossy black, markings upon the face, the buttock and the under parts being white. The great-ringed horns sweep back from the forehead in a sabre-like curve, and the neck is adorned with a mane. These antelopes went about, in old times, in herds, and were prizes for the sportsmen, while their flesh was excellent to eat. Extensive descriptions may be found in the writings of Gordon-Cumming, Anderson, Baker, Selous, Bryden, and other African sportsmen-travelers.

Sable, Cape. See CAPE SABLE.

Sable Island, a low-lying island in the Atlantic, in lat. 44° N. and lon. 60° W., 85 miles east of Nova Scotia. It is a chain of sand-dunes enclosing a lagoon, and is such a menace to navigation that the government of Canada maintains two lighthouses here. It was formerly 40 miles long and is now but 20, gradually sinking. Upon its sandy ridges grow cranberries and wild grass, and attempts are being made to grow pines and other hardy ever-

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greens. There are sandbanks in the vicinity. The only inhabitants are the lighthouse and lifeboat men attached to the establishment for the relief of shipwrecked persons. The island is known for its breed of hardy wild ponies.

Sabots, sā-bōz', shoes for women largely worn by the peasantry of France, Belgium, Holland, and some other parts of Europe. They are especially useful in wet weather, and in moist places generally, being well adapted to preserve the feet from damp. Great numbers of sabots are exported by France to Belgium. In some parts of England, as in Lancashire, shoes with thick wooden soles, but with leather vamps or "uppers," are worn by most of the artisan class. See **BOOTS AND SHOES**.

Sabre-Tache, sā-br-tāsh, a leathern case or pocket worn by cavalry officers at the left side, suspended by three straps from their sword-belt. It came into use when the jackets of cavalry soldiers were too short or too tight to admit of pockets being made in them, but is now rather ornamental than useful.

Sabre-toothed Tigers, extinct cats of the family *Machærodontidæ* (or *Nimravidæ*), a group whose remains occur as fossils from the Eocene up to the Pleistocene. They differ from ordinary cats (*Felidæ*) in several anatomical features, having some peculiarities which ally them to the bears, and others recalling existing viverrids, as the foussa (*Cryptoprocta*). They are remarkable for the character of the dentition, which in the earlier genera comes near showing the complete number of teeth, but displays a steady tendency as the family history is followed toward the reduced number possessed by existing cats. At the same time the dentition is often distinguished by the huge size of the upper canines, which in some cases were five or six times as long as the neighboring teeth, and have been justly called "sabre-teeth." These tushes reached their highest development in the genus *Machærodus*, whose species were of very wide distribution, occurring in both North and South America and in Europe. These carnivores were of various sizes, up to dimensions equal to those of modern tigers, and so little different in general from true cats that Cope places them within the *Felidæ*. It began in the Eocene and continued down almost or quite to the Glacial Period, when the type seems to have become extinct because the great canines had overgrown usefulness and become a hindrance instead of a help in getting a living. They finally became so large that the animal could not open its mouth wide enough to make use of them in biting, and the space between them would admit none but a very small piece of meat to enter, even if a large piece could be torn away. "Even when the mouth opens so far as to allow the mandible to pass behind the apices of the canines," remarks Cope, "there would appear to be some risk of the latter being caught on the point of one or the other canine, and forced to remain open, causing early starvation." Other prominent genera in the family are the plantigrade *Dinictis* (q.v.); *Nimravus* and *Pogonodon*, with species as large as panthers; and *Hoplophoneus*, with dentition like modern cats. Consult: Flower and Lydekker, 'Mammals, Living and Extinct' (1891); Cope, 'Vertebrates of the Tertiary Formation of the West,' Rept.

U. S. Geol. Survey, Vol. III. (Washington, 1884); Woodward, 'Vertebrate Palæontology' (1898).

Sac (sāk) **City**, Iowa, county-seat of Sac County; on the North Fork of the Raccoon River, and on the Chicago, M. & St. P. and the Chicago & N. W. R.R.'s; about 42 miles west by south of Fort Dodge. It is in an agricultural region where considerable attention is given to raising live stock. The chief manufacturing industries are connected with farm products. The trade is chiefly in farm and dairy products, flour, and agricultural implements. The educational institutions are the Sac City Institute (Baptist), a high school, public elementary schools, and a public library. Pop. (1890) 1,249; (1900) 2,079; (1910) 2,201.

Sac Fungi. See **FUNGI**.

Sac-à-Lait, sāk'a-lā, a fish. See **CRAPPIE**.

Sacbut, or **Sackbut**, the word by which translators have rendered the *sabbeka* of the Hebrew Scriptures. The exact form of the sabbeka has been much disputed, but that it was a stringed instrument is certain, for the name passed over into Greek and Latin in the forms *sambukē*, *sambuca*, and the instrument so called is described by Athenæus as a harplike instrument of four or more strings, and of a triangular form. It is not unlikely that this instrument was introduced among the Jews from the East, since one of the musical instruments most frequently occurring in the Assyrian sculptures answers very closely to this description, and may perhaps be identified with the sabbeka, the name of which is, besides, Chaldaic. Nothing resembling this Assyrian instrument is to be found on the Egyptian monuments or in the sculptures of Greece and Rome. Since the sabbeka was a stringed instrument the rendering sacbut is altogether wrong, since that was, at the time when our translation of the Scriptures was made, the name of a wind-instrument now called the trombone. See **TROMBONE**.

Sac'caton Grass. See **GRASSES OF THE UNITED STATES**.

Saccharin, sāk'a-rin, $C_6H_4\langle\begin{smallmatrix} CO \\ SO_2 \end{smallmatrix}\rangle NH$, benzoic-sulphinid, a sweet substance discovered by Remsen and Fahlberg in 1879. It is prepared from toluene by a series of chemical processes. White crystals soluble in hot water, alcohol, and ether. Its characteristic and most valuable property is its intense sweet taste, being about 550 times sweeter than cane-sugar so that a solution of one part in ten thousand parts of water has a perceptible taste. It has an extensive use as a sweetening agent in the manufacture of various beverages, preserves, jellies, etc., and may be used by diabetic patients who cannot use sugar. It has not, however, the food value of cane-sugar.

Saccharine forms salts with bases, the sodium salt being frequently used in place of saccharin because of its greater solubility.

Saccharometer, or **Saccharimeter**, any instrument used to determine the strength of a sugar solution. One common form is a hydrometer with the stem so graduated as to read per cents of sugar content in solution examined. Another is a form of polariscope devised

by Mitscherlich with the scale on which the angle of deviation of the plane of polarized light is read so graduated as to show the percentage of sugar in the solution used.

Saccopharynx, a genus of *Muraenidae*, with a single species (*S. flagellum*), a deep-sea conger eel, of which only three specimens have been observed: muscular system very feebly developed; bones thin and soft, wanting in organic matter; head and gape enormous; stomach distensible in an extraordinary degree; vent at end of trunk. The specimens known have been found floating on the surface of the North Atlantic with their stomachs much distended, having swallowed some other fish many times their own weight. They attain a length of several feet. See DEEP SEA EXPLORATION.

Sacheverell, sǎ-shěv'ě-rēl, Henry, English Anglican divine: b. Wiltshire about 1674; d. London 5 June 1724. He was educated at Oxford and in 1705 was appointed preacher of Saint Saviour's, Southwark. While in this station he, in 1709, preached two famous sermons, the object of which was to rouse apprehensions for the safety of the Church, and to excite hostility against the Dissenters. Being impeached in the House of Commons he was brought to trial in February 1710, and on 23 March, when the trial was concluded, was suspended from preaching for three years. This prosecution, however, excited such a spirit in the High Church party that it helped to overthrow the ministry of Godolphin, and established the fortune of Sacheverell, who, during his suspension, made a kind of triumphal progress through the kingdom. The same month that his suspension terminated (1713) he was appointed to the valuable rectory of Saint Andrew's, Holborn, by Queen Anne. Of the offending sermons 40,000 copies at least were sold, and of the record of the trial 30,000. Little was heard of Sacheverell after this party ebullition subsided, except through his numerous squabbles with his parishioners. His abilities, even according to writers on his own side, were very slight. Consult Stanhope, 'History of Queen Anne's Reign' (1872).

Sachs, sǎks, Bernard, American neurologist: b. Baltimore, Md., 2 June 1858. He was graduated from the University of Strasburg, Germany, in 1882, and engaged as a medical practitioner in New York. He has made a specialty of the study of nervous diseases, regarding which he is a recognized authority. Besides numerous medical monographs he has published 'Mental and Nervous Diseases of Children' (1894).

Sachs, Edwin O., English architect: b. London 5 April 1870. He was educated at University College School, London, and at the University of Berlin, and engaged as an architect in London in 1892. He has established a wide practice in connection with theatres and public buildings and in 1898 applied electrical power to the working of the stage for the first time in England. He founded the British Fire Prevention Committee in 1897 and organized the first International Fire Prevention Congress in London in 1903. He has published: 'Modern Opera Houses and Theatres' (3 vols., 1896-8); 'Facts on Fire Prevention' (1902); 'Stage Con-

struction' (1898); 'Fires and Public Entertainments' (1897).

Sachs, Hana, hānts zǎks, German master-singer: b. Nuremberg 5 Nov. 1494; d. there 20 Jan. 1576. He was by trade a shoemaker, and followed his business and made verses with equal assiduity. From 1510 to 1515 he traveled over different parts of Germany, practising his craft, according to the custom of German workmen, in all the towns he visited. In the latter year he returned to his native town, where he was admitted as master in his guild. He early attached himself to the Reformation movement, to the spread of which among the *bourgeoisie* he contributed not a little by a poem written in 1523, 'Die Wittenbergisch Nachtigall, die man jetzt höret überall,' in which he hailed with approval the cause of Luther. In 1544 he was with the army of Charles V. in France. The productions of Hans Sachs are extremely numerous. In 1536 he estimated the number of his poems at 5,000 or more. Three volumes of his poems were published during his lifetime, and two more after his death. In the 17th century, after the introduction of a more artificial style into German poetry, Hans Sachs fell into neglect, from which he was not withdrawn till Goethe, who had become acquainted with him in his studies for 'Faust,' drew attention to his merit in a poem (Erklärung eines alten Holzschnitts vorstellend Hans Sachsens Poetische Sendung) which appeared in the 'Deutscher Merkur' (April 1776). The best edition of his works is that of Keller and Goetze, and the best selection that of Gödeke and Tittmann in 'Deutsche Dichter des sechzehnten Jahrhunderts' (2d ed., 1883-5). He possessed a fruitful genius, and, notwithstanding the rudeness of his language, his poems are distinguished for *naïveté*, feeling, invention, wit, and striking description. Consult: Schweitzer's 'Etude' (1889); Goetze's 'Hans Sachs' (1894); Genée's 'Hans Sachs und seine Zeit' (1893); and Drescher, 'Studien zu Hans Sachs' (1891).

Sachs, Julius, German botanist: b. Breslau 2 Oct. 1832; d. Würzburg 29 May 1897. He studied at Prague where he became assistant in botany, and in 1867 became professor of botany at Freiburg. The following year he removed to Würzburg, where in his own laboratory he made extremely important experiments in the physiology of plants. He published 'Handbuch der Experimental-Physiologie der Pflanzen' (1865); 'Lehrbuch der Botanik' (1868-74); 'Vorlesungen über Pflanzenphysiologie' (1882-7); 'Geschichte der Botanik vom 16. Jahrh. bis 1860' (1875); 'Gesammelte Abhandlungen über Pflanzenphysiologie' (1892-3).

Sachse, sǎks, Julius Friedrich, American author: b. Philadelphia, Pa., 22 Nov. 1842. He engaged in journalism and has written extensively, his publications including: 'The German Pietists of Provincial Pennsylvania, 1694-1708'; 'Horologium Achaz-Christophorus Schissler, Artifex'; 'Justus Falckner, Mystic and Scholar' (1903); 'Pennsylvania: the German Influence in its Settlement and Development'; 'The German Separatists of Pennsylvania, 1708-1743.'

Sachsenhausen, zǎk'sēn - how - zēn. See FRANKFORT-ON-THE-MAIN.

Sachsenspiegel, zāk'sēn-spē'gēl, a private collection of legal precepts and legal customs which had the force of law in the Middle Ages in Germany, especially in the north of Germany. One of the six prefaces to the collection mentions one Eyke von Repgow as its author, and this account is generally accepted as true. Its date is supposed to be earlier than 1235. The study of it has been revived in Germany. The best edition is by Homeyer (Berlin, 1835-44).

Sack, a general name for the different sorts of dry wine, more especially the Spanish, which were first extensively used in England in the 16th century.

Sackbut. See SACBUT.

Sacketts (sāk'tēts) Harbor, N. Y., village, in Jefferson County; on Black River Bay, the inlet through which Black River discharges its waters into Lake Ontario; and on the Rome & Watertown railroad, which is a branch of the New York Central & Hudson River railroad. The village is about 10 miles from Watertown, eight miles from Lake Ontario, and 170 miles west-northwest of Albany. It has a good harbor, large enough to accommodate vessels of the largest size, and it has steamer connections with several of the lake ports. Sacketts Harbor is one of the oldest places on the northern frontier; in 1809, the Oneida, the first United States war vessel, was built here. In the War of 1812 the village was the scene of several engagements, and was an important United States naval station. The frigates Madison and Superior, war vessels, were made here in 40 and 80 days respectively, from the time the timber was cut. A third warship was nearly completed when peace was restored; the hulk remained in the yard for a number of years. The United States military station, Madison Barracks, is located here. Sacketts Harbor is in an agricultural region, and although it has good water power, there is but little manufacturing. Pop., exclusive of garrison (1910) 868.

Sackville, sāk'vīl, **Charles**, 6TH EARL OF DORSET, English courtier and poet: b. 24 Jan. 1637; d. Bath 29 Jan. 1706. He became a wit and roisterer, in the company of Charles II., served under the Duke of York in the sea fight with the Dutch in 1663 and is said to have written or retouched on the night before the engagement of 3 June his famous song, "To all you ladies now on land." He succeeded to his title in 1677, but did not stand well in the favor of James II., and later became an ardent supporter of William of Orange, under whom he was lord chamberlain of the household from 1689 to 1697, and three times one of the regents during the king's absence. He was a patron of poets like Prior and Wycherley, and Dryden dedicated to him the "Essay on Satire."

Sackville, **Lionel Sackville Sackville-West**, BARON, English diplomatist: b. Cambridgeshire 19 July 1827; d. Knole Park, Sevenoaks, Eng., 3 Sept. 1908. After a private education, he entered the diplomatic service in 1847, was made secretary of legation at Turin (1858), Madrid (1864), Berlin (1867), and Paris (1868), and was envoy extraordinary and minister plenipotentiary successively to the Argentine Confederation (1872-8) and to Spain

(1878-81). In 1881 he was appointed minister to the United States, and in 1888 with Joseph Chamberlain and Sir Charles Tupper negotiated the fisheries treaty of that year. In October 1888 he received a letter from one C. F. Murchison, who, representing himself as an Englishman naturalized in the United States, asked for which party he should vote in the ensuing Presidential election. The minister in reply advised his correspondent to vote the Democratic ticket as favorable to English interests. The Murchison letter was generally regarded as a trap set for the embarrassment of the minister. His recall was at once asked for, and in default of a prompt compliance with the request the Department of State sent him his passports 30 October. The incident, occurring as it did during a Presidential canvass, was the subject of much discussion. He died 3 Sept. 1908.

Sackville, **Thomas**, EARL OF DORSET and BARON BUCKHURST, English statesman and poet: b. Withyham parish, Sussex, 1536; d. London 19 April 1608. He was a member of the University of Oxford, but removed to Cambridge, and afterward became a student of the Inner Temple. At both universities he was distinguished for his performances in Latin and English poetry, and in the Temple wrote the last two acts of the tragedy of 'Gorboduc, or Ferrex and Porrex' (1565). Of a poem intended to comprehend a view of the illustrious but unfortunate characters in English history, entitled the 'Mirror for Magistrates,' he finished only a poetical preface (the 'Induction') and one legend on the life of the Duke of Buckingham. The work was completed by George Ferrers and Richard Baldwin (1559-63). He sat in the Parliament assembling 20 Jan. 1558, and in the first two Parliaments of Elizabeth (1559-63) after which he traveled. In 1586 he was made a member of the court appointed by Elizabeth to try Mary Queen of Scots. In 1598 he was joined with Burleigh in negotiations for peace with Spain, and renewed a treaty with the United Provinces. On the death of Burleigh, he became lord high treasurer. In January 1601 he was appointed lord high steward, and presided at the trial of the Earl of Essex. On the accession of James I. his post of treasurer was confirmed to him, and in 1604 he was created Earl of Dorset. He ranks among the most prudent and able of the ministers of Elizabeth, was a good speaker and a still better writer. The tragedy of 'Gorboduc,' the subject of which is a sanguinary story from early British history, is the first example in English of regular tragedy in blank verse. Sackville's share is inferior in literary value to his 'Induction,' called by Sidney Lee the greatest English poem between the 'Canterbury Tales' and the 'Faerie Queene.'

Saco, **José Antonio**, hō-sā' ān-tō'nē-ō sā'kō, Cuban historian and publicist: b. Bayamo, Cuba, 7 May 1797; d. Madrid, Spain, 26 Sept. 1879. He was educated in Havana and in 1821 was appointed professor of philosophy in the Seminary of San Carlos. In 1832-4 he lived in Havana and edited the 'Revista Bimestre Cubana,' but his liberal and anti-slavery principles caused his banishment, though he was afterward allowed to return. He traveled in Europe and in 1840 settled in Paris where he resided for many years. He was elected a dele-

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gate to Madrid in 1866 to advocate political reforms for Cuba and in 1878 was elected to the Spanish cortes. He wrote: 'Paralelo entre Cuba y algunas colonias inglesas' (1838); 'Supresión del tráfico de enclavos en Cuba' (1845); 'Ideas sobre la incorporación de Cuba á los E. U.' (1848); 'Historia de la esclavitud desde dos tiempos mas remotos' (1876 et seq.); etc.

Saco, sâ'kô, Maine, city in York County; on the Saco River, and on the Boston & Maine railroad; about 15 miles west-southwest of Portland and four miles from the ocean. Four bridges span the river connecting the city with Biddeford and other localities. A fall in the river of about 40 feet furnishes extensive water-power. The tide-water extends to the falls. The chief manufacturing establishments are cotton mills, boot and shoe factories, lumber mills, manufactories of belting, brushes, and cotton-mill machinery. The city has an extensive coast trade in cotton goods and other manufactures, and it ships considerable farm products. Old Orchard, a popular seaside resort, is in the vicinity. The principal public institutions are Thornton Academy; York Institute, founded in 1866; a public high school and elementary schools, two libraries, one home for the aged, several fine churches, and a number of good business blocks. Pop. (1890) 6,075; (1900) 6,122; (1910) 6,583.

Saco, a river which has its rise in the White Mountains in New Hampshire, and flows southeast through New Hampshire and Maine, and enters the Atlantic Ocean. It is about 165 miles long and drains an area of 1,750 square miles. It is a swiftly flowing stream having a number of rapids and falls, which furnish abundant water-power for manufacturing. Great Falls is 72 feet high.

Sacramentarians, a religious term which at present is applied almost solely to members of the Protestant Episcopal Church in America, and the Anglican Church in England and elsewhere, who sustain a "high" view of the efficacy of the sacraments. In past ecclesiastical history it has had a wholly different meaning, and was applied to those Reformers who refused to agree to Luther's doctrine of the real presence of the body and blood of Christ in the bread and wine. The Sacramentarian party were the authors of the Tetrapolitan Confession, so called from the four cities of Strasburg, Constance, Lindau, and Memmingen, which supported the Sacramentarian doctrines. This confession excluded all idea of a physical presence of Christ's body. The Swiss reformer Zwingli took a similar position on the question of Christ's presence in the Eucharist, and an article prepared by him declaring against the real presence was embodied in the confession of the Helvetic Church. The German Sacramentarians joined the general body of Protestants in resisting Charles V., and became merged with the Lutherans.

Sacramento, Cal., city, port of entry, county-seat of Sacramento County, and capital of the State, on the Sacramento River, and on the Southern P. and Central P. R.R.'s; 90 miles northeast of San Francisco. The city is situated in lat. 38° 33' N., and lon. 121° 20' W.; and is built on a broad, low plain, 30 feet above sea level. The streets are wide and straight and

cross each other at right angles. Shade trees are abundant. The shops and stores are built of brick and the dwellings mostly of wood. The city is noted for its beauty of environment, is the centre of an extensive agricultural and horticultural section; and has a warm, almost semi-tropical climate.

Public Buildings.—The State capitol building, completed in 1869, at a cost of \$2,500,000, stands in a plaza covering 30 acres. There is a United States government building here, the Crocker Art Gallery, building of the Foresters, Odd Fellows, and Masons, and Fort Sutter (re-built). California State Bank, Sacramento Institute, College of the Christian Brothers; California State Library (113,000 volumes), Public Library (28,000 volumes), Howe's Academy, Saint Joseph's Academy, City Dispensary, Railroad Hospital, and numerous churches, schools, and charitable institutions. The city has three daily newspapers and numerous weekly and monthly periodicals.

Manufactures.—Sacramento is the second manufacturing city in California, and has a variety of industries, including flouring and grist mills, foundries and machine shops, lumber mills, breweries, manufactories for saddlery, harness, furniture, carriage, soap, and crackers. The repair shops of the Southern-Pacific railroad are located here, giving employment to 3,000 men. The industries of Sacramento represent a capital invested of \$7,300,013, with an annual output valued at \$11,141,896. The city exports immense quantities of flour and grist mill products, to China, Japan, and Australia.

Government.—The city is governed by a mayor and city council elected every two years by a popular vote. There are well equipped fire and police departments. The waterworks are owned and operated by the municipality. The assessed property valuation of the city is about \$18,000,000. The streets are lighted by electricity. An annual State fair is held here, and an exhibition building, park, and race course are maintained by the State Agricultural Society.

History.—The first white settlement on the site of Sacramento City was made in 1839, by Captain John A. Sutter, a Swiss by birth, but a naturalized American citizen, who obtained a grant of 11 square leagues of land from the Mexican government. In 1841 Captain Sutter built a fort which he called New Helvetia. He took many of the neighboring Indians into his service, collected a few white trappers, and by virtue of his isolated position and the number of his adherents, secured influence and importance in the territory. Sutter's Fort, as it was popularly called, was the first point in California settled by immigrants crossing the continent; with the increase of the population the trade and importance of New Helvetia kept apace, and in October 1848 there was an auction sale of lots in the town of "Sacramento" which was first named in the advertisement of the sale. In January 1849 the first frame house was built on the banks of the Sacramento River, and here the settlement was moved from the fort. The site of the town was originally only about 15 feet above low-water mark, and as the river frequently rose to 20 feet, the town was subjected to overflows. In January 1850, in March 1852, and again in January 1853, the city was flooded so

that boats were used in going from house to house; after this the lower streets were raised five feet, and a levee was built which saved the city from subsequent floods. On 3 Nov. 1852 a conflagration destroyed 600 houses and other property, entailing a loss of \$5,000,000. In July 1854 another fire destroyed property valued at \$650,000. The State capital was established here by an act of the Legislature on 25 Feb. 1854, but not until 1861 was a capitol building erected. On 3 Feb. 1856, the first railroad was opened between Sacramento and Folsom. In the gold days of 1849-50 Sacramento was the great mart of the mines, the base of supplies and the metropolitan centre of various mining camps. Steamers ran daily to San Francisco and up the river to Red Bluff. The California Stage Company with a capitalization of \$1,000,000 ran daily stages to Maryville, Nevada, Downieville, Stockton, Jackson, Mokelumne Hill, and other leading towns in the mining district. The city was first incorporated as a town in 1849, and was chartered as a city in 1863.

Population.—Sacramento in 1860 had a population of 13,788; (1880) 21,420; (1890) 26,386; (1900) 29,282; (1910) 44,696.

H. WEINSTOCK,
of Weinstock, Lubin & Co.

Sacramento, a river in California which rises in the northern part of the State, flows south in the valley between the Sierra Nevada and the Coast Range, and uniting with the San Joaquin River (q.v.); both break through the Coast Range, and enter the Suisun Bay, from which the waters pass through a strait into the Bay of San Pablo, and to the Pacific through San Francisco Bay and the Golden Gate. The chief tributaries are the Pitt River, from the northeastern part of the State, and Feather River, which enters the Sacramento about 15 miles above the city of Sacramento. The Sacramento is about 400 miles long, from the source of the Pitt to the mouth of the Sacramento is about 600 miles. The river is navigable for about 270 miles from its mouth, and the Feather River for about 30 miles from the Sacramento. The debris from placer mining has been a hindrance to navigation; large sums have been expended to improve navigation. The Sacramento Valley is a fertile region, in which are raised large quantities of grain and fruits.

Sacramento Salmon, Perch, Pike, etc., local names in California for various fishes caught in the Sacramento River, and more or less widely elsewhere. The salmon is the quinnat (q.v.). The Sacramento sturgeon is the white sturgeon (see STURGEON). The Sacramento perch is a fish (*Archoplitis interruptus*) closely related to the eastern rock-bass (see BASS). It reaches from one to two feet in length, is blackish above, sides silvery, with about seven vertical blackish bars, more or less interrupted. It is an excellent food-fish. The Sacramento pike is a big minnow (see SQUAW-FISH). The sucker is a species (*Catostomus occidentalis*) formerly of great importance to the Indian population, but little esteemed in civilized markets.

Sac'ramenta. The Latin word *Sacramentum* was in the classical period a judicial and military technical term. The underlying concept seems to be consecration to a divinity,

something set apart for that purpose as sacred and inviolable. Thus the term was applied in jurisprudence to the specified sum of money deposited with the judicial authorities by the parties to a suit, and was so designated either because the place of deposit was sacred, or because the sum forfeited by the losing party was used for religious purposes. In military parlance the word signified originally the preliminary engagement entered into by newly enlisted recruits, and afterward the military oath of allegiance which became obligatory after the second Punic war (Liv. xxii. 38). Later on the term was used to designate any oath or solemn engagement whatever.

Among ecclesiastical writers the word has had various significations. In earlier usage, represented for instance, by the ancient Latin version of the Scriptures, and maintained even in many passages of the Vulgate (for example, Eph. v. 32, Rev. i. 20, etc.) it was a synonym of *arcanum*, and corresponded in sense to the Greek word *μυστήριον*, the notion embodied being that of something secret or mysterious, whence also, by extension, it came to denote the sign or symbol whereby hidden things were signified, especially in matters referring to religion. Thus Augustine says: "Symbols when pertaining to things divine are called sacraments." As certain religious rites of paganism were called mysteries on account of their occult signification known only to the initiated, the equivalent word "sacrament" was naturally adopted by the early Christians to designate their own religious rites and ceremonies, and was used at first more or less indiscriminately with reference to any or all of them. There seems to have been no attempt on the part of early Christian writers to define the sacraments accurately or enumerate them. Thus they speak vaguely now of two, now of more sacraments, at times even restricting the term to the Eucharist as *the* sacrament, and opposing it to Baptism. Nor do we find in their writings any definition of a sacrament more explicit than the rather general notion formulated by Augustine, "a sign of something sacred." In the literary treatment of this as well as other doctrinal topics analytic precision and systematic classification came gradually with the development of theological thought.

Roman Catholic theologians of the mediæval and subsequent periods understand by sacraments in the strict specific sense of the word, a definite category of sacred rites or symbols of divine institution, and which in virtue of this institution have the power of conferring instrumentally the grace or sanctity which they symbolically represent. Of these a certain number are allowed to have belonged to the Old Dispensation, being typical of the sacraments of the New Law, but the intrinsic efficiency attributed to them is limited (with however certain reserves in favor of the rite of circumcision taken to be the Old Testament type of Christian baptism) to the bestowal, not of internal, but external sanctity, that is, legal purifications, etc. With regard to the sacraments of the New Law, Roman Catholic theologians hold that they are seven in number instituted by Christ (namely, Baptism, Confirmation, Eucharist, Penance, Extreme Unction, Holy

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Orders, and Matrimony), and this enumeration, together with the main points of doctrine concerning the sacraments collectively and individually has been fixed by the dogmatic definitions of the Council of Trent.

The Reformers of the 16th century who professed to retain only such beliefs as were clearly demonstrable from Scripture, rejected the doctrine of the seven sacraments, but did not at once agree as to the number to be admitted, some recognizing besides Baptism and the Eucharist, Confirmation, Penance and Orders, while others rejected one or the other or all of these last. As regards the present status of opinion, if we except the High Church section of the Anglican communion, Protestant denominations as a rule, recognize only two sacraments: Baptism and the Eucharist.

That the existence of seven sacraments instituted by Christ cannot be proved from the New Testament alone must, of course, be granted, even by Roman Catholic theologians, but they claim that such proof is not necessary, since according to the fundamental Catholic contention, the New Testament writings do not furnish a complete record of Christ's actions—they are not, unless supplemented by tradition and the voice of the living Church, an adequate criterion of Christian belief and practice. They contend, moreover, that if the Scripture alone is to be held as decisive in the matter, consistency would require that the ceremony of the washing of the feet (John xiii.) be counted among the sacraments, since it seems to fulfil all the requisite conditions. (Sc. permanent divine institution, v. 4 seqq. cf. 12-18. Signification and production of grace, v. 8.)

Be that as it may, it must furthermore be conceded in connection with the appeal to tradition, that no positive proof of the recognition in the early church of seven sacraments neither less nor more, can be gathered from the writings of the Fathers. An explanation of this silence has been sought in the heretofore widely assumed influence of the so-called *Lex Arcana*, or Discipline of the Secret, whereby the early Christians were, it was claimed, bound to secrecy with regard to their beliefs and mysteries for fear of profanation on the part of the pagans. But apart from the obvious consideration that there could have been no sufficient reason to make a secret of the number seven, especially when we find that things so sacred as Baptism and the Eucharist are currently mentioned, the most competent authorities of the present day, Roman Catholic as well as Protestant, deny the existence of the *Lex Arcana* as a general prohibitive measure. As such it is chiefly a creation of the 17th and 18th century theologians (consult: Batiffol, 'Études d'Histoire et de Théologie Positive,' Paris, Lecoffre, 1902).* Consequently, others endeavor to explain the silence of antiquity regarding the explicit mention of seven sacraments on the ground that no systematic, synthetic treatment of the subject was attempted by the early writers. Whatever may be the value of this consideration, it is certainly rather strange to find that so late as the 12th century Saint

Bernard enumerates no less than 12 sacraments. Roman Catholic theologians therefore rely chiefly on the so-called argument of prescription which is formulated as follows. At the time of the Reformation the entire Christian Church, East and West, was in peaceful, undisturbed possession of the doctrine of the seven sacraments. From the fact that then, as now, it was common to both the Greek and Latin Communion, is inferred that it must have been held in the Church at a period anterior to the separation of the Greeks in the 9th century. For apart from the antecedent improbability that any doctrinal growth peculiar to the Latin Church would have been adopted by her hostile rival, we do not find, as a matter of fact, that in the various discussions relative to the reunion of the two churches there was ever any difference to be adjusted relative to the number of the sacraments, though matters of seemingly less consequence were often made the object of protracted dispute. A similar line of argument, though less cogent, is pursued with reference to the Oriental sects—Nestorians and Monophysites—who separated from the Church in the 5th century. Whence, it is argued: if this doctrine was that of the Christian Church in the 5th century, it cannot be of other than apostolic origin, for the spirit of the early Church was hostile to all doctrinal innovations, as is proved by the history of the great controversies, and she would doubtless have resented any alteration of the original belief in a matter so important and of such a practical character as that referring to the number of the sacraments. It will be noticed that this argument is partly *a priori*, involving the contested assumption, that with regard to the point at issue it was impossible for the Church to have undergone any change of belief.

In the synthesis of theological speculation elaborated by the scholastics, the sacramental system was conceived as an extended application and a consistent carrying out of the great principle embodied in the Incarnation. In this mystery, according to the belief of most Christians, the invisible Godhead, the author of life and grace, was made flesh and dwelt among us, imparting to men through his tangible, human life and ministry that life of the spirit without which salvation is impossible. Hence the idea of conferring and developing the spiritual life through the instrumentality of visible material things ordained to that purpose was recognized as a principle underlying the entire economy of external means of grace in the Church. As regards the seven sacraments the theory is thus systematically worked out in the theology of Thomas Aquinas (1226-74). There is an analogy between the natural and the spiritual life in man. In the natural order man is born; he attains strength and maturity through growth; he is nourished by food; should illness occur he needs medicine; the common good requires the propagation of the race, and the supervision of legitimate authority; and finally, man needs to be prepared for his departure from this world. Now the parallel needs in the spiritual order are provided for through the seven sacraments. Thus, man is born in baptism, strengthened in confirmation, nourished by the Eucharist, and cured

*For a well meant but quite ineffectual defense of the old view concerning the Discipline of the Secret, consult McDonald, 'The Apostles' Creed.'

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from illness by penance; the Christian Church is propagated through matrimony, and by holy orders proper guides are provided in things spiritual; and lastly by extreme unction the believer is prepared for his passage into eternity.

While this comparison is ingenious, and instructive as a part of a logical coherent system, it cannot, of course, be adduced as a proof that there are precisely seven sacraments, for obviously it was excogitated to fit the case, and had the number of sacraments then admitted been six or eight or more, the analogy would doubtless have been worked out just as satisfactorily. It proves at most that in the 13th century the doctrine of the seven sacraments had been definitely recognized. As regards the effects of the sacraments, it may be remarked that Catholic theology claims for three of them (Baptism, Confirmation, and Orders), besides the conferring of grace common to all, the impression upon the soul of an indelible mark or "character." This effect is produced even when through a lack of disposition on the part of the subject no grace is bestowed, whence these three sacraments, when validly administered, are never repeated. If sometimes in the case of baptized converts, baptism is again administered conditionally, it is only on account of some doubt as to the validity of the rite previously conferred. The proof for the existence of this "character," which Protestants unanimously reject, is based chiefly on the ancient practice of the Church with regard to the non-repetition of these sacraments, and on certain texts from the works of early writers who express more or less vaguely the doctrine formulated later on by the theologians and the Council of Trent.

The views of the early Reformers concerning the mode of efficiency proper to the sacraments were, no less than those concerning their number, a radical departure from the received Catholic doctrine. According to the latter the sacraments produce their effects *ex opere operato*, by which formula is meant, that whenever the rite is properly administered and no obstacle or indisposition exists on the part of the subject, saving grace is imparted to the soul, by virtue of the rite itself as an instrumental cause, and independently of the dispositions of the minister or subject—at least so far as the essential effect is concerned. This mode of efficiency is sometimes expressed by saying that the sacraments contain the grace which they signify. Not that grace can be inherent in the physical symbols, but that through a divine ordinance it is infallibly connected with their administration.

While Protestant authorities are generally agreed in rejecting this doctrine, there is among them much divergence of opinion when it is a question of determining the nature of sacramental causality. Thus according to the Zwinglian and Remonstrant doctrine the sacraments are not properly a means of grace. "They were not ordained to signify, seal, and apply to believers the benefits of Christ's Redemption, but simply to be significant emblems of the great truths of the Gospel." The Reformed Church holds the sacraments to be a means whereby grace is conferred, but "their efficacy is due solely to the blessing of Christ and the working of His

Spirit, and this efficacy is experienced only by believers." According to the Lutherans the sacraments confer grace in virtue of their own inherent power, but their efficacy resembles that of a sermon; it can act with saving effect only upon believers, and the beneficial efficiency of the rite consists chiefly in animating the faith of the receiver and strengthening his confidence in the divine promises.

To substantiate the *ex opere operato* or direct, independent causality, Roman Catholic theologians adduce certain passages of the New Testament referring to sacramental efficiency, and in which the saving effect is attributed directly to the rite itself as the secondary instrumental cause. Thus in John iii. 5 spiritual regeneration is expressed as a birth of water and the spirit. Similarly Paul asserts that we have been saved "through the washing of regeneration" (Tit. iii. 5) and he admonishes Timothy to stir up the gift of God which is in him through the laying on of hands.

Another argument is based on the very ancient custom of infant baptism, one that was retained by several of the Protestant denominations. If infants are really born again to a new life by means of the ceremony of Baptism, we can scarcely conceive such an effect otherwise than as due to the immediate efficiency of the rite itself. Obviously it is not because the faith of the subject has been stimulated. Neither can the faith of the minister be the efficient cause, since, apart from other reasons, the Church has always maintained the validity of Baptism even when conferred by heretics and schismatics—the sacramental rite when properly administered was supposed to possess its own efficiency.

Consistently with this view it has been the constant teaching of the Church ever since the controversy between Pope Stephen and Cyprian in the 3d century, that neither faith nor righteousness is required in the minister of the sacraments for their valid administration. A certain intention, however, is postulated, namely, that of doing what the Church intends to effect by the rite in question. In other words, it is required that the minister intend to perform the rite not in his own name, but, implicitly at least, as a representative of Christ and of the Church. This intention can be extremely vague—in fact, reduced to a minimum—provided the effect intended by the Church be not positively excluded. As is well known, this question of the requisite intention is one of the main points at issue in the controversy concerning the validity of Anglican orders.

Other questions pertaining to the sacraments are of less importance and belong rather to a complete detailed treatment of the subject as found in the ordinary handbooks of theology.

Consult: Hodge, 'Systematic Theology,' Vol. III. (Protestant); Wilhelm and Scannell, 'A Manual of Catholic Theology,' Vol. II. (R. C.). See BAPTISM; CONFIRMATION; EUCHARIST; etc.

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N. Y.

Sacred Heart, Brothers of the. See ORDERS, RELIGIOUS.

Sacred Heart, Ladies of the. See ORDERS, RELIGIOUS.

SACRED HEART — SACRIFICE

Sacred Heart, League of, or Apostleship of Prayer in League with the Sacred Heart of Jesus, a pious association whose object, the glory of God and the salvation of souls, is expressed by its motto, "Thy Kingdom Come." The association was founded at Vals, France, on 3 Dec. 1844, the feast of Saint Francis Xavier, by Father Francis Xavier Gautrelet. The director-general of the League is the father-general of the Society of Jesus, and the principal seat or centre of the association is established at Toulouse. There are also diocesan directors and local directors for every centre. Promoters, who assist in extending the work of the association, are appointed by the local directors. The names and addresses of all the members of the association are kept on record. The number is so great in many centres that the card catalogue system is used. The number of local centres in the world, in October 1903, was 60,904, and in these centres there were registered over 20,000,000 associates or members. The directors of these 60,904 local centres are in communication through their diocesan directors and 37 periodicals, called 'Messengers of the Sacred Heart,' with the general director now (1904) living at Tournai, Belgium. The 'Messenger of the Sacred Heart' is published in 22 languages; 6 of the 37 are in English and 6 in Spanish. Other languages in which it is published are German, French, Albanian, Breton, Bohemian, Chinese, Catalanian, Croatian, Flemish, Dutch, Hungarian, Italian, Malabar, Indian, Polish, Portuguese, Slavonic, Hindustani, Arabian, and Greek. In January 1904, there were about 5,000,000 members in the United States. In addition to the league periodicals, another most important means of communication are the leaflets distributed each month by the promoters to all the members. The leaflets give the "General Intention" for which all are to pray and work during the month, and supplement the 'Messenger' in suggesting ways and means of uniting with the efforts of the missionaries throughout the world for the conversion of souls. Consult: 'Handbook of the Apostleship of Prayer'; 'Messenger of the Sacred Heart' (magazine, February 1904, New York); Ramière, 'Apostleship of Prayer.'

Sacred Heart of Jesus, Feast of the, a feast celebrated by the Roman Catholic Church the first Friday after the feast of Corpus Christi. This feast originated in the latter part of the 17th century, as the special and formal devotion to the Heart of Jesus, owes its origin to Margaret Mary Alacoque, a French nun of the Visitation Order. Her biographers relate that the Lord Himself appeared to her and gave her instructions regarding the devotion. Many in the Church had practised devotion to the Sacred Heart of Jesus from the time of the Crucifixion, as Cyril, Cyprian, Tertullian, Basil, Ambrose, Saint Francis of Assisi, and others, but the devotion was not general nor popularly advocated until the time of Margaret Mary Alacoque. Consult: Gallifet, 'The Adorable Heart of Jesus'; Tickell, 'Life of Blessed Margaret Mary Alacoque'; Nilles, 'De Rationibus Festorum Sacratissimi Cordis Jesu et Purissimi Cordis Mariæ.'

Sacred Monkey, any of several apes, monkeys and baboons regarded as venerable by har-

barous people in various periods and regions. See APE; BABOON; HANUMAN; LANGUR; etc.

Sacred Order of Siam, The. See ORDERS, ROYAL.

Sacred Treasure, Order of the. See ORDERS, ROYAL.

Sacrifice, the offering of anything to God or to a god; also the thing so offered. Sacrifice is common to all religions. In the lowest state of inculture the sacrifice is an offering of some article of food to the god, who is believed actually to eat the flesh of the victim or the fruits of the earth, which his worshippers deposit at his customary haunts—in some cave, at some fountain, or some sacred tree. But more usually a sacrifice is a feast of which the god and his worshippers both partake. In the best times of the Roman commonwealth this idea of a meal common to the gods and men had recognition in every household; for the Roman family never rose from table at the end of the principal daily meal till a portion of the food had been consumed on the hearth as an offering to the household gods. Of like significance is the fact that the slaughter of an animal for food and the offering of one in sacrifice are expressed by the same word in Hebrew; and that the Arabians pronounce over every animal they slaughter for food the name of Allah. In all sacrifices, whether of the pagan nations or of the people of Israel, certain portions of the victim were reserved for the deity—the blood, the fat, the head, shoulders, viscera, etc.; the rest was eaten by the worshippers. Usually the portions reserved for the god were consumed by fire, whereby, for the imagination of primitive peoples, the material offerings were etherealized, ascending to heaven in savory clouds of smoke and vapor. In many religions, too, as in that of Egypt, certain sacred animals are regarded as related to the tribal god, and as such are reserved wholly for sacrificial uses. The object of the sacrificial feast is always to renew and strengthen the ties of kinship and friendship between the god and his worshippers, and so to secure the continuance of material prosperity. This primitive sacrificial system is not without religious value; at least it is genuine; the ideas which it embodies are for every worshipper realities. And it has considerable ethical value, too, as binding the worshippers not only to the god, but to one another. The goods it seeks are material, but they are always public and social; it gives the individual no place except as a member of the tribe or gens. A new and radically different conception of sacrifice is formed when the tribal system begins to break up. Before a sacrifice can now take place an animal has first to be surrendered by its owner and consecrated. Dedication takes the place of natural sanctity. It is this new and important element that changes the character of sacrifice. The act of surrender, which is at first a mere preliminary, comes to be regarded as the essential feature. A sacrifice begins to be spoken of as a gift or tribute from the worshipper to the deity, and the original sacramental idea is gradually lost sight of. Is this a forward or a backward movement of thought? Two interpretations are possible. If the sacrificial gift is simply an expression of the truth that all private property is

SACRILEGE — SACY

a trust from God and ought to be devoted to His service, the new conception is an advance and can do nothing but good. But if it be supposed that God stands in need of gifts, and that the more numerous and costly the oblations the greater their efficacy, the tribute-idea is a backward movement. Sacrifice then becomes nothing but a method of conjuring. The historical outcome of the gift or tribute theory is holocausts, hecatombs, and human sacrifices. These last are a strange instance of reversion to barbaric practice. Human sacrifice is natural among cannibals; the food that is most grateful to man is always presented to the gods. Its revival among civilized peoples is the result of a very different train of thought. Those who begin to measure the atoning power of a sacrifice by its magnitude, splendor, or cost cannot forget that they have possessions more precious than flocks and herds. Hence in times of great distress they begin to conjure the displeasure of their gods with offerings of their own flesh and blood.

In primitive Israel the central feature of sacrifice is always the common meal, provided for by the slaughter of the sacred animal and by various kinds of cereal oblation. Time gradually robs the meal of its sacred character, and then the holocaust becomes common. After the exile the great sacrifice is the sin-offering, which culminates in the solemn ritual of the day of atonement. It is generally supposed that the central idea of the sin-offering is that of substitution — Jehovah accepting the life of the victim for that of the sinner. That is probably a mistake. Just as in the earlier sacrificial meal, so here, the significant part of the rite is not the shedding, but the application of the life blood, followed by the burning of certain portions of the flesh and eating of others.

The thinkers of Greece and the prophets of Israel wage a constant polemic against the popular superstitions connected with the sacrificial system. Some of the latter seem to break away entirely from ritual, others do much to give it an ethical and spiritual meaning. Christianity embraces whatever is true both in the sacramental and in the dedicatory idea of sacrifice. The former idea receives its perfect expression in the first Christian rite, the latter in the first rule of Christian ethics, which transfigures sacrifice into self-sacrifice. But the followers of Christ are slow to rise to the height of His teaching. Material sacrifice is always easier than spiritual. See OFFERINGS AND SACRIFICES.

Sacrilege, the act of violating or profaning any sacred thing or any place that has been dedicated to the service of God, as a church or a chapel; in popular usage it means breaking into a place of worship and stealing therefrom. Another meaning of sacrilege is the alienating to laymen or to common uses, of what has been dedicated, appropriated or consecrated to religious persons or purposes; as thus understood, sacrilege is an offense triable by ecclesiastical courts. In the Roman law robbery of churches was, under the Justinian Code, punishable with death. It was formerly a capital crime in English common law also, but by the statutes 24 and 25 Victoria burglary of churches is treated simply as burglary, and theft of sacred things from sacred places as larceny. Neither in the stat-

utes of the United States nor in those of any of the individual States of the Union is sacrilege treated as a crime in any way different from common burglary or larceny. Consult: Spellman, 'The History and Fate of Sacrilege.'

Sacristan, the original of the name "sexton," which is an abbreviation of sacristan, the former title being still retained in some churches. The sacristan is an officer in a church whose duty it is to take care of the church and all belonging to it, the sacred vestments and utensils, etc., and prepare whatever may be required for the sacred offices.

Sacristy, in the ancient Church a building attached to the basilica and consisting of three parts: (1) The reception room, in which the bishop was received by the clergy and also gave audiences. It was in this room at Milan that the Emperor Theodosius asked absolution of Saint Ambrose. (2) The sacristy proper in which the sacred vessels and vestments were kept for immediate use; here the officiating ministers robed themselves for divine service. (3) The chamber in which office books, vestments, and church plate not in present use were kept. In many modern churches the sacristy is called the vestry, and consists of but one room.

Sacrobosco, sāk-rō-bōs'kō, Joannes de (John of Holybush, Hollywood, or Halifax), English mathematician and astronomer: b. Halifax, Yorkshire; d. Paris 1256. He entered the University of Paris in 1221, afterward becoming a professor there. His most celebrated work is a treatise, 'De Sphæra Mundi,' a paraphrase of a portion of the *Almagest* (q.v.), of Ptolemy (q.v.). It was printed in 1472, and was afterward frequently reprinted, with the additions of able mathematicians. He was also the author of a treatise, 'De Ratione Anni, seu de Computo Ecclesiastico'; a work on arithmetic, bearing the title 'De Algorismo,' which is one of the earliest treatises on the subject in which the Arabic numerals are used. It was printed at Paris in 1498, with the 'Commentary of Petrus Cirvillus.'

Sacrum, the sacred bone (*os sacrum*), a compound triangular bone situated at the lower part of the vertebral column (of which it is a natural continuation), and wedged between the two innominate bones so as to form the keystone to the pelvic arch. In man it consists of several vertebræ with their bodies and processes consolidated into a single bone. Its anterior surface is concave from above downward and from side to side. The posterior surface is convex, and presents in the middle vertical line a crest, formed by the fusion of the spines of the vertebræ, of which the bone is composed. The last sacral vertebra has, however, no spine, and the termination of the vertebral canal is here very slightly protected. In the female the sacrum is broader than in the male. The sacrum of man differs from that of the lower animals by its greater breadth in comparison with its length. See ANATOMY; OSTEOLOGY; PELVIS; SPINE.

Sacy, sâ-sê, Antoine Isaac, BARON SILVESTRE DE, French Orientalist: b. Paris 21 Sept. 1758; d. there 21 Feb. 1838. Obtaining a thorough acquaintance with the Greek and Latin classics, he studied Hebrew, Syriac, Chaldean,

Samaritan, and then Arabic and Ethiopic. To these he added a knowledge of the principal European languages, including Turkish. Later he mastered Persian. During the Revolution he withdrew to a short distance from Paris, and lived unmolested, though his attachment to monarchy was well known. In 1795, when the Convention established a school of Oriental languages, De Sacy was appointed professor of Arabic, and was allowed to retain this situation notwithstanding his refusal to take the oath to the new constitution. Bonaparte made him professor of Persian in the College of France (1806), and afterward bestowed upon him the title of baron (1813). In 1808 he was elected by the department of the Seine into the legislative body; but took no part in the debates till 1814, when he voted for Napoleon's deposition. In 1815 he was appointed rector of the University of Paris, and shortly after member of the commission for public education. While officiating in these capacities he formed around him a circle of scholars, by which he became indirectly the teacher of all Europe. He took a prominent part in founding (1822) the Asiatic Society of Paris, of which he was president; and it was by his recommendation that professorships of Chinese, Sanskrit, Manchu, and Hindustani were established in the capital. In 1832 Louis Philippe raised him to the peerage and made him, after Remusat's death, which took place in this year, conservator of the Oriental MSS. in the royal library. Among his works may be mentioned: 'Principes de Grammaire générale' (1799); 'Grammaire Arabe' (1810); and 'Chrestomathie Arabe' (1806); 'Exposé de la Religion des Druses' (1848); 'Calila et Dimna' (1816).

Saddle, a seat for a horse's back, contrived for the safety and comfort of the rider. In early ages the rider sat on the bare back of his horse, but in course of time some kind of covering was placed over the back of the animal. The modern riding saddle consists of the tree, generally of beech, the seat, the skirts, and the flaps, of tanned pig's skin, and the construction and weight vary according to the purposes for which it is to be used. Among the varieties are racing saddles, military saddles, hunting saddles, and side saddles for ladies. The name saddle is also given to a part of the harness of an animal yoked to a vehicle, being generally a padded structure by means of which the shafts are directly or indirectly supported.

Sad'dlerock Oyster, a large and favorite kind of oyster originally obtained from a reef known as Saddle Rock near Norwalk Harbor, Connecticut. The supply was exhausted early in the last century, but in the first attempts at artificial cultivation of oysters (q.v.) in the eastern part of Long Island Sound many small "seed-oysters" were derived from that district, and so the name continued until it became a market term about New York for large and well-shaped oysters mostly sold to be eaten raw.

Sadducees, sād'ū-sēz, a sect of the Jews well known in religious history on account of being mentioned in the New Testament. Beyond their name, however, very little is known regarding them. Even the origin of their name is undecided, though there seems plausibility in the argument that it is derived from the high-

priest Zadok, who anointed Solomon as the successor of David, and whose descendants appear to have been prominent many ages after in the Jewish community. It is conjectured that the Sadducees may have been members and adherents of the house of Zadok. The Sadducees denied that the oral law, handed down by tradition as the utterances of Moses, had equal authority with the written law, and they rejected the doctrine of the resurrection, and also denied, according to the New Testament, the existence of angels and spirits. According to Josephus the Sadducees also disbelieved that there was such a thing as fate, whereas the Pharisees, the other great Jewish sect, while not denying nor questioning liberty of will, held that all actions and events were fixed by unalterable decree. The Sadducees seem to have disappeared as a separate body after the first century of the Christian era, although an existing Jewish sect, the Karaites, agrees with them in the rejection of oral law. See JEWISH SECTS.

Sadhs, sads, or Saadhs, sā'ads, a Hindu sect which believes in one God, and teaches a pure morality. The sect was founded 1658 A.D. by a man called Birbhan. They have no temples, but assemble at stated periods in houses, or courts adjoining to them. They are found chiefly in Farukhabad, Delhi, Mirzapore, etc.

Sadi, sā-dē', or Saadi (MOSLEHEDIN SHIRAZI), Persian poet: b. Shiraz about 1184; d. there 1291 or 1292. After completing his studies and spending many years in travel, he settled in the neighborhood of Shiraz, where he enjoyed the favor of several Persian rulers. The Persians esteemed him exceedingly on account of his golden maxims, which they consider as a treasure of true wisdom; and also on account of his pure, elegant, and simple style. Of his works (1) a collection (Divan) of lyric poems in the Arabic and Persian languages; (2) 'Gulistan' ('Garden of Roses'), a didactic work composed both of prose and verse, in eight books; (3) a work in verse, called 'Bustan' ('The Orchard'), containing a collection of histories, fables, and moral instructions. The complete works of Sadi were published in Persian at Calcutta (1791-5). Graf has published translations from the 'Divan' in the 'Zeitschrift der morgenländischen Gesellschaft,' and there is a German translation of the political poems by Rückert (with life of Sadi, 1894). There are editions of the 'Gulistan' by Sprenger (1851) and others, and among English translations are those by Eastwick (1880) and Ross (1823). The 'Bustan' has been edited by Graf (1858) and Rogers (1891), and translated into English by Davies (1883), and in part by Sir Edwin Arnold ('With Saadi in the Garden,' 1888). Consult Ouseley, 'Biographical Notices of Persian Poets' (1846).

Sadi-Carnot, sā-dē kār-nō. See CARNOT.

Sadler, sād'lēr, Anna Teresa, Canadian writer: b. Montreal, P. Q., 1856. She has written much for the Roman Catholic press, and her published books include: 'Ethel Hamilton, and Other Tales' (1877); 'The King's Page' (1877); 'Seven Years and Mair' (1878); 'Women of Catholicity' (1885); 'The Silent Woman of Alood' (1887); 'Gems of Catholic Thought,' a compilation (1882); etc.

Sadler, or Sadleir, Sir Ralph, English diplomatist: b. Hackney 1507; d. Standon, Hertfordshire, 30 Marsh 1587. He became the ward of Thomas Cromwell, was one of Henry VIII.'s principal secretaries of state, and was appointed by Henry's will one of the council to assist the executors upon whom was laid the government of the country and the guardianship of young Edward VI. He went into retirement during Mary's reign, but emerged after the accession of Elizabeth, and became one of Cecil's agents, especially charged with negotiating Scottish affairs. In 1568 he became chancellor of the duchy of Lancaster and thereafter he was mainly occupied as one of the English commissioners to treat of matters relating to the Queen of Scots. In 1580 he was for a time one of her guardians at Sheffield and Wingfield. His last mission was to James VI. of Scotland in 1587 to endeavor to reconcile him to the execution of his mother. Consult Sadler's State Papers, with memoir and historical notes by Sir Walter Scott (1809).

Sadler, Reinhold, American legislator: b. Prussia 10 Jan. 1848. He came to the United States when young, and has been for many years a resident of Nevada. He was elected lieutenant-governor of Nevada in 1895, and on the death of Governor Jones in 1896 became governor. He was regularly elected to the office in 1898, which he occupied until 1903.

Sadler, Walter Dendy, English painter: b. Dorking, Surrey, 12 May 1854. He studied art in London and Düsseldorf, and has exhibited at the Royal Academy since 1873. Among his best known pictures are: 'Thursday'; 'Darby and Joan'; 'The Widow's Birthday'; 'The New Will'; and 'For Weal or Woe.'

Sado, sā'dō, Japan, an island off the west coast of Hondo, opposite and 32 miles from Nūgata, with an area of 336 square miles, and a coast line of 135 miles. It has a diversified surface culminating in Kimpokusan, 3,820 feet high. South of Kimpokusan is the town of Aikawa, near the east coast, with the ancient and still productive gold and silver mines in its vicinity, to which Sado owes its celebrity. On the west coast 18 miles distant from Aikawa is Ebisuminato, the port of the island. Pop. of island 113,000.

Sadoletto, sā-dō-lā'tō, Jacopo, Italian theologian: b. Modena 1477; d. Rome 18 Oct. 1547. He was consecrated bishop of Carpentras, near Avignon, in 1517; belonged to the Contarini Reform Party, and was a member of the commission appointed by Paul III. to take steps toward effecting a church reformation. He immediately opened a correspondence with Erasmus, Bucer, Sturm, and Melancthon, but when in 1539 he invited the Genevans, to return to the Roman Catholic Church, he received a harsh rebuff from Calvin. After that he confined himself largely to his own diocese. He had been appointed cardinal in 1536, but while he was frequently summoned to Rome he preferred Carpentras, and his study well stocked with books of the new learning, in which he was an adept, being one of the best Latinists of his day. He wrote commentaries on the Psalms, and on the Epistles of Saint Paul, and so excellent was their style that Erasmus made the somewhat invidious remark

that "their very polish of expression will take off the edge of their pious suggestiveness." His works were published in four volumes in 1734. He was a diplomat in whom successive popes had confidence and acted as ambassador to Francis I. in the interests of peace in 1544. Consult Joly, 'Etude sur J. Sadolet' (1856).

Sadowa, sā'dō-vā (Czech *Sádová*), Austria, in Bohemia, near Königgrätz, on the Bistritz, a village remarkable as one of the hotly contested Prussian positions in the decisive battle of 3 July 1866, in which the crown prince of Prussia and Prince Frederick Charles commanding the Prussians, defeated the Austrian forces under Benedek. This battle is known also as the battle of Königgrätz.

Sæmund (sā'moond) the Wise, Icelandic scholar: b. Iceland about 1155; d. Oddi 1233. He undertook a course of foreign travel in pursuit of learning, and visited Paris and Rome; then, returning to Iceland, he became priest at Oddi (1176). He was unknown to scholars till about 1643, when the newly discovered 'Elder Edda' and other writings were falsely ascribed to him.

Safe, a receptacle for money, important papers, and valuables, usually of iron or steel, or of both combined. A safe, to justify its name, should be proof against fire, explosives, acids, drills, wedges, and the other implements and opening devices resorted to by burglars. The history of safe-making is mainly a record of struggles between the burglar and the safe-manufacturer; the result is, that safes can now be obtained which are all but impregnable. With the modern safe of the best kind the lock may be said to be the only vulnerable point; hence much care and ingenuity have been expended on its mechanism. Numerous patents, mostly of American origin, have been introduced in recent years. Of these, the keyless permutation locks deserve particular mention, as they obviate the danger which arises from lost or false keys. Such locks allow of opening only after an indicator has been moved in accordance with a certain combination of numbers arranged before closing the safe. Some safe-locks are so constructed that to be freed they require different keys on different days, some can only be opened at a certain hour, this being fixed on before the door is closed; while others again require two or more keys in charge of different persons; in fact, the arrangements contrived to render the plundering of safes next to impossible are too numerous even to mention. The connection of safes with electric alarms in a variety of ways forms another safeguard.

Safe-conduct, a security granted by the sovereign authority, or persons delegated by it, to strangers or other persons to enable them to repair to and return from a certain place undisturbed. In most of these cases passports have now taken the place of special safe-conducts. Sometimes the safe-conduct is given to persons accused, to secure them against harm when summoned to an examination.

Safe Industry in America. Various methods for the safe-keeping of treasure, jewels and other valuables have been in use since the earliest periods in history, and the advancement in this line has necessarily kept

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space of the times, the increase in the volume of wealth throughout the world of course rendering it imperative that more improved facilities for guarding this accumulated wealth be put into use. Thus we have witnessed the evolution from the old-fashioned strong-box to the massive chilled-iron and steel vaults, absolutely fire-proof and burglar-proof, till they have reached the highest degree of efficiency and perfection that science and skill can make them. Locks of rude construction were in use by the ancient Egyptians, and during the Middle Ages by the Romans. The Chinese also used a lock similar in construction to the famous Bramah lock, invented in England in 1784. These were made of wood, the tumblers being of different lengths to fit the sizes of the wards in the keys. Beginning with the Middle Ages the inventive genius of man was turned toward providing something more substantial than a lock as a method of warding off the burglar, who at that time had not attained to the remarkable skill and cunning of the modern "cracksman," and indeed the professional thief of modern times would look back with envy on his predecessor who had nothing more than a mere wooden box, sometimes bound with iron, with which to cope. The first means of securing valuables was by placing them in some secret cavity in a wall, the door of which was opened by a spring or other device, but more often articles of household furniture were used, such as desks with secret drawers, or tables and chairs with false bottoms. These constituted the chests of the wealthy for some time and some of them were furnished with locks and bound with strips of iron, the whole very artistically made so as to ward off suspicion of their contents. The oaken-chest or strong-box, reinforced with iron bands and knees, was in the beginning of the 18th century considered to be the best means of security. Such a chest was used in 1707 to guard the crown jewels of Scotland, but when they were to be examined by the Royal Commissioners, the locks of the chest had to be broken and the lid forced up because there was no other manner in which the chest could be opened, an operation which the modern blacksmith would consider an easy task to perform.

Prior to the beginning of the 19th century practically no attempt was made to make these strong-boxes of a material which would withstand heat or which would in any way render them impervious to the ravages of fire. The first improvement along this line was made in France about 1820, the safes then constructed consisting of a metal box built within double walls, the space between being filled with a composition of non-conducting substances. A little later a so-called fire-proof safe was constructed in New England, considered to be a vast improvement over the existing types. This safe had a body of solid oak plank from three to four inches thick, which, after being thoroughly saturated with an alkali, was covered with sheets of thin iron. To make this more surely fire-proof bands of iron were crossed and recrossed over these plates and nailed down with large round-headed iron spikes,

the whole affair being a very gruesome and formidable looking object. The great fire in New York in 1835 proved the worthlessness of these, several hundred of them being then destroyed. The idea of filling in the walls of a safe with a nonconducting substance was first put into use in this country in 1843 by Daniel Fitzgerald. His idea was to fill the walls of the safe with plaster of paris because of its tendency to throw off heat, and having secured a patent on his invention he immediately began to manufacture a safe known as the "Salamander." His patent was later assigned to B. J. Wildey, who made a safe called "Wildey's Patent," the principle of these being to leave the space between the walls empty, trusting that the contents of the inner portion of the safe would be protected from heat by the nonconducting properties of the air. Other mixtures such as asbestos, mixed with plaster of paris, clay, alum, fire-clay, mica, chalk, etc., were then used to fill the vacant space but none of these have proven absolutely safe. To-day the modern safe is filled either with a substance, alum or some other salt, which when heated gives off a quantity of water; or by placing in the walls a receptacle, either glass or metal, containing water so as to give off steam when the outside walls become overheated. The idea of using steam as a nonconductor originated with Prof. A. K. Eaton, of New York, who learned by experiment that the contents of a safe could not be injured by fire so long as steam at 212° F. surrounded the inner chamber, but the main objection to the use of water as a nonconductor lay in the fact that this subjected the contents of the safe to constant dampness. The use of substances which contain water in their chemical composition has, however, largely done away with this objection.

Outside of the fire element, the most important part of the safe to be considered is the lock, for with our modern methods of fire protection the danger of burglary is more imminent than the loss by fire. The first supposedly nonpickable lock was the Bramah, but this was finally proven to be valueless and easily picked, this being done in 1851 by a Mr. Hobbs, by the "tentative process." Three other locks then came into use, the Chubb, also picked by Mr. Hobbs, the Pye lock, invented in 1851, but picked by Linus Yale, Jr., of Philadelphia, by the "impression process," and the Yale lock. Since then many new forms of locks have been invented, and the modern lock-combinations are constructed in a manner which has made the trade of burglary extremely difficult while they are otherwise absolutely fire-proof. There are three ways of procuring security against burglary, first, by the laminated construction; second, by the use of blocks of chilled iron, this method being more useful in the construction of large vaults than in the making of portable safes; and third, by the spherical chilled-iron safe. In the first method of construction the chamber is made of alternate layers of hard and soft plates of iron and of plates of hardened steel, the two laid alternately over each other in the walls of the chamber in such a way that they form a single mass. Thus the

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body of the safe being constructed of alternate plates of iron, welded iron and steel, carbonized and decarbonized steel, and crystal steel, fastened together by means of bolts from the inside has made safes practically impregnable to the appliances used by the modern burglar, such as sledge-hammers, jimmies, jackscrews and other devices. Another method of making safes, in common use by manufacturers, is to roll down together while hot into one solid sheet of tempered steel three layers of soft iron or steel alternated with two intermediate layers of hard steel. These composite sheets, when they have been rolled till about one-half of an inch thick, are then built into the walls of the safe and alternated with plates of heavy steel about one-half inch thick. The doors are generally the weak point in the construction of a safe, for it is these which a burglar first attacks to see if there is any crevice into which a wedge might be inserted, or any crack into which nitro-glycerine or any other high explosive might be introduced. In some safes the plates comprising the door are dovetailed, engaging with the corresponding parts of the jamb; in some an air-tight packing is used between the jambs and their abutments; while in others a screw door is used.

One solid mass of metal is used in the second and third types of safes, the tough and hard qualities of the metal being obtained by modification. The metal used is a soft, malleable iron, the surface of which can be hardened by cooling. In the construction of many vaults, blocks of this "chilled-iron," weighing from three-quarters to several tons, are bolted together on the inside, the sides being dovetailed together, and the outside surface is chilled to the highest degree of hardness. The door is a single casting of iron, two inches thick, and also chilled on the outside.

In the third type, the spherical, invented by William Corliss, the shell, constructed of steel from four to seven inches thick and chilled to a depth of about two inches, sometimes contains a "bugging" made from Franklinite ore found in Sussex County, N. J. This material, which possesses a hardness exceeding that of the best tempered steel, and is in appearance somewhat like crystallized silver, is so interwoven with wrought-iron rods that it can be battered with the greatest degree of force but will only bend, not break. The purpose of this construction of wrought and crystallized iron is to hamper a burglar in his work, it being supposed that in an attempt to drill through the walls of the safe, the drill will penetrate the soft metal more readily than the hard, and, consequently, working sideways, will be broken off when it strikes the hard metal. The "bugging" may, however, be used in precisely the opposite manner, the rods being made of the hardest tool-steel and the body of the filling composed of cast-iron segments, but the principle of turning the point of the "cracksman's" drill is the same.

In our large banks and safe-deposit vaults there is no room sufficiently large to contain the number of individual safes which would

be required to hold the enormous masses of money and other valuable securities with which these institutions are intrusted. This has turned the attention of the manufacturer in recent years to the building of large vaults which would be absolutely fire and burglar-proof. The interior of these vaults may be constructed to suit the tastes and requirements of the owner, but the walls are now made much thicker than formerly and the builder has made more use of fire-proofing materials. The most important feature of the modern vault is the lock, which has now reached the acme of perfection. The first form of lock used was the combination-lock, an outgrowth of the "tumbler" lock, and the mechanism of these is very ingenious. These locks are not limited in the number of combinations upon which they may be set, and may be changed at any time should the combination become known to undesirable persons. The most valuable asset of the modern vault, however, is the chronometer, or time-lock, the mechanism of which is as intricate and as complicated as the best watch but at the same time it runs as true and as smoothly. To offset any possible disarrangement in the mechanism of a single clock, which would, of course, prevent the opening of the safe, three movements are usually inclosed in a single case. As these safes cannot be opened by any human agency until the time set for the clock to operate the mechanism which swings back the ponderous doors, it is obvious that the chronometer combination is the greatest safeguard against robbery which the bank can employ.

In 1905 there were 31 establishments engaged in the manufacture of safes and vaults, capitalized at \$7,326,133. There were 415 officials and salaried clerks, with yearly salaries of \$723,097; wage-earners, 3,488; wages, \$2,162,246; miscellaneous expenses, \$801,309; cost of materials used, \$3,211,336; and producing goods annually to the value of \$7,861,069. The value of the American safe has been recognized in foreign countries, and to-day may be found throughout Great Britain, Europe, Asia, Africa, Australia, South America, etc. See **LOCK**; **FIREPROOFING**; **BUILDING**; **BUILDING: Fireproofing**; **VAULT**, ETC.

Safed, sā'fēd, Palestine, occupies the summit of a hill 2,700 feet high, on the shores of the Mediterranean, six miles northwest of the Sea of Galilee. Safed was a fortified place of importance during the Crusades, and is one of the four holy cities of the modern Jews in Palestine, their settlement dating from the 16th century. Pop. (estimated) 19,000.

Safety-Lamp. See **LAMPS**.

Safety-valve, a device used upon steam boilers and other vessels subject to an internal pressure, for the purpose of automatically preventing that pressure from rising to a dangerous intensity. It consists essentially of an opening in the boiler (or other vessel), over which a suitable lid or "valve-disk" is fitted. The valve-disk is pressed against its opening with a definite, constant pressure, whose magnitude is regulated according to the pressure that the boiler is intended to carry. So long as the pressure that the steam within the boiler exerts upon the under side of the valve disk is less

SAFFLOWER—SAFFRON

than the constant force with which the disk is pressed down upon the opening, the valve remains closed, and no steam escapes. If the pressure within the boiler rises, however, so that the steam exerts upon the disk a total pressure that is greater than the external force that tends to hold the disk in place, the valve opens and permits steam to escape until the pressure in the boiler is sufficiently reduced for the external force to again close the opening. There are three general types of safety-valve in use, which are respectively known as "dead-weight," "lever," and "pop" valves. The fundamental principle of operation is the same in all, and the classification relates merely to the means that are employed to hold the valve-disk against the opening in the boiler. In the "dead-weight" valve, this is accomplished by placing weights directly upon the valve-disk. Safety-valves of this type can be recommended for low pressure boilers, and they are greatly used, in England, upon heating boilers, and also upon kitchen boilers. They are not adapted for use in connection with high pressures, however, for the load resting upon the valve-disk must then be very great, in order to prevent the valve from opening at the ordinary running pressure. It is common, therefore, to use the "lever" type for high pressure service. In this type the valve-disk is held against its seat by the action of a weight, but the weight does not rest directly upon the disk. A horizontal lever two or three feet long is provided, and this is pivoted at one end, while the weight is attached near its free end. The centre of the valve disk comes directly under the lever, a few inches from the pivoted end, and the lever is supported by means of a stout vertical rod whose lower end rests upon the centre of the valve-disk. By this means the total downward force acting upon the disk and tending to keep it in position may easily be made to be eight or ten times as great as that which would be realized if the weight rested upon the valve-disk directly; and the pressure at which the valve will open can be nicely regulated by shifting the position of the weight upon the lever arm. In the "pop" valve, the disk is forced against its seat by means of a stout spiral spring, which is held in position by a framework, or casing, which is securely attached to the boiler. The compression on the spring is regulated by means of a screw that acts upon its upper end, and which can be turned by a wrench. It is now customary, however, to have the adjusting screw entirely within the casing of the valve, so that the attendant in charge of the boiler cannot tamper with it; the casing being provided with a lock, the key to which remains in the possession of the owner of the boiler. The name "pop" refers to the sound that these spring valves make when they open and close. Lever valves and dead-weight valves open and close gradually, and before they open they give warning by a hissing sound. "Pop" valves, on the contrary, open without any such premonitory signal, and when they close they do so with corresponding quickness. "Pop" valves are used exclusively upon railroad locomotives, as the violent swaying and vibration to which these are subject would render weighted valves undesirable.

Safflower, a large thistle-like composite plant (*Carthamus tinctorius*) with orange-colored flowers, said to have been originally brought from the East, but now naturalized in many parts of Europe, and extensively cultivated. The tubular flowerets are collected, dried, and somewhat used as a feeble laxative medicine, in place of, or as an adulterant of, saffron. They are, however, chiefly important as the source of carthamin, a dyeing principle originally much employed by the Chinese, and later by occidental silk manufacturers, as it gives brilliant, although fugitive red tints; mixed with French chalk, it forms the cosmetic rouge. In Spain the flowers are used to color soups, and other dishes. The Jews in Poland are remarkably fond of the flowers, and mix them with their bread and most of their viands. Oil, in India, is expressed from safflower seeds, for culinary and lighting purposes.

Safford, säff'örd, **Truman Henry**, American mathematician: b. Royalton, Vt., 6 Jan. 1836; d. Newark, N. J., 13 June 1901. He was early known as a calculator of great skill; in 1845 prepared an almanac; by a method of his own abridged by one fourth the task of computing the rising and setting of the moon; and after his graduation from Harvard was officially connected with the observatory there in 1854-66, acting in 1866 as director. In 1865 he was appointed professor of astronomy in the University of Chicago and director of the Dearborn observatory, in 1874-6 was a member of the United States coast-survey, and in 1876-1901 professor of astronomy in Williams College. He was a fellow of the American Academy of Arts and Sciences, of the American Association for the Advancement of Science, and an associate of the Royal Astronomical Society of England. He studied the nebulae, discovering many new ones, computed cometary and planetary orbits, and for some time devoted his attention to latitude and longitude work for the United States corps of engineers, for which he prepared a star-catalogue. Among his further published writings were a catalogue of polar-stars, 'Mathematical Teaching and its Modern Methods,' and numerous contributions to astronomical journals, to the 'Proceedings' of the American Academy, and to the notices of the Royal Society.

Safford, James Merrill, American geologist: b. Zanesville, Ohio, 13 Aug. 1822. He was graduated from the Ohio State University in 1844 and in 1848-72 occupied the chair of natural science at Cumberland University, Lebanon, Tenn. He was professor of chemistry at the University of Nashville and at Vanderbilt University in 1874-94, and of natural sciences at the latter in 1875-1900, where he now occupies the chair of geology. He was State geologist of Tennessee in 1854-60 and 1871-1900. His publications include many papers on geological subjects, beside: 'Geological Reconnaissance of Tennessee' (1856); 'Geology of Tennessee' (1869); 'Elements of the Geology of Tennessee' (1900); etc.

Saffron, a bulbous autumnal plant (*Crocus sativus*) and a commercial dye-stuff obtained from it. The cultivated saffron originated probably in the Levant, and was grown in early times about the town of Corycus, Cilicia (from which the *Crocus* genus may have taken its name).

SAG HARBOR — SAGASTA

The Arabs cultivated it in Spain, about the 10th century, and it was an important crop in England, especially about Saffron Walden, in the 15th century, bringing the highest market price. It is now raised about the Mediterranean, and in Asia. The saffron is low, with the grass-like leaves, and long-tubed, funnel-shaped flowers, springing directly from the ground, which are characteristic of the crocuses. Its flower is purple, with a style tipped with three orange-colored stigmas, each more than an inch long, depending from one side of the perianth. These stigmas are picked off in the early morning, and dried on a kiln, either loosely or between layers of paper, and under the pressure of a thick board which forms the mass into cakes, about 4,000 of these stigmas being necessary to give an ounce of saffron. In either case the commercial saffron is liable to suffer from adulteration. This adulteration was so prevalent at one time that those guilty of it (when caught) were killed.

Saffron stigmas, when genuine, have a characteristic orange red color, and an aromatic, bitter odor and taste. The substance has faint carminative and narcotic properties, but is seldom used medicinally, except for coloring tinctures. In the 'Song of Solomon' the saffron is mentioned among the sweet-smelling herbs, and it was much in demand among the Greeks and Latins for its perfume. A fragrant essence was made from it with water and wine for sprinkling in theatres and other places, even in the streets, for anointing the hair, and for the bath. Saffron was also much employed in culinary operations, chiefly for its aromatic taste and for coloring, as the clown in the 'Winter's Tale' says he "must have saffron, to color the warden pies."

Saffron, however, is most commonly used as a dye, giving a yellow hue to cloth, but is being displaced by cheaper colors. This tint was in very early times the royal color in Greece, and was that of some of the women's court robes, but afterward was appropriated by the hetairæ. In Ireland and the Hebrides it was also the color of the king's mantle, and of the shirts of persons of rank. Saffron enters largely into the composition of the sacred spot on the forehead of a Hindu Pundit. An extract made from saffron, used as a glaze on tinfoil, imitated gold in mediæval illuminations, and was also employed by painters.

HELEN INGERSOLL.

Sag Harbor, N. Y., village in Suffolk County; on Gardiner's Bay, an inlet from the Atlantic Ocean, and on the Long Island railroad; about 100 miles east of New York. It has a good harbor, regular steamer connections with New York and several of the Long Island coast towns. It has several manufactories, chief of which are a watch-case and silverware factory, flour and cotton mills, a tannery, and machine shops. The Sacred Heart Academy (R.C.), opened in 1877, a Union school, public and parish schools, and a library constitute the educational institutions. There are three banks with a combined capital of \$100,000. The village is a favorite summer resort.

At one time Sag Harbor was noted for its interests in whaling; its income from that industry amounting to \$1,000,000 some years. In those days its tonnage equaled that of New York. The Indian relics found in and near the

village show it was once an important Indian settlement. Pop. (1910) 3,408.

Saga, sã'gã, from the word meaning "to say," is a narrative of the past handed down by word of mouth. The name is applied to a large collection of mythical, semi-mythical, and historical works written mainly in Iceland chiefly in the 12th and three following centuries. The most conspicuous and important of the historical sagas are Snorre Sturlason's *Heimskringla*, the *Njals Saga*, the *Egla*, and the *Sturlunga Saga*. Consult Horn's 'History of the Literature of the Scandinavian North,' translated by Anderson. In Scandinavian mythology the name of the goddess who presides over history. She dwells in *Sokkvabeg*, where she and Odin sit drinking joy from golden goblets.

Saga, sã'gã, Japan, capital of the province of Fizen, on the island of Kiu-siu, 74 miles northeast of Nagasaki. It is an important seaport and commercial centre. The town is intersected by numerous streams, chief of which is the channel of *Sentonofutsu*; 50 miles long. It unites the Gulf of Simabara with the Northern Sea, and is of considerable commercial importance. Pop. 32,753.

Sagard, sã-gär, Theodat Gabriel, French Roman Catholic missionary. He labored in converting the Huron Indians to Christianity during the 17th century, and contributed, in an important degree, to a knowledge of Canada in its early colonial days as "New France." His principal works are: 'Travels to the Huron Country, towards the Freshwater Sea and the Uttermost Limits of New France, called Canada; Wherein is Treated of all Matters touching the Country, the Manners and Character of the Savages; their Government and their Ways, as Well in their Own Country as when Roaming; of their Faith and Belief; with a Dictionary of the Huron Language' (1632); also, 'History of Canada and the Journey made by the Friars Minor Recollects Thither, for the Conversion of Unbelievers.' An edition of his works was published at Paris in 1866.

Sagasta, sã-gãs'tã, Praxedes Mateo, Spanish statesman: b. Torrecilla en Cameros 21 July 1827; d. 5 Jan. 1903. He studied at the College of Engineers in Madrid, practised as an engineer in Valladolid and Zamora, in 1854 was elected from Zamora province to the Cortes, where his attitude was a radical one, and in 1856 for participation in an unsuccessful revolt was compelled to escape to France. Upon the proclamation of amnesty, he returned, became professor in the Madrid College of Engineering, re-entered the Cortes, was identified with the Progressive minority, and edited its journal, 'La Iberia.' After the outbreak of 22 June 1866 he again fled to France, but at the beginning of the revolution of 1868 was once more in Spain, where he became minister of the interior in the provisional government. In October 1871 he was chosen to the presidency of the Cortes, in December entered the *Malcampo* cabinet as minister of the interior, in February 1872 was commissioned to form a new ministry, but in May was forced to resign. In 1874 he appeared anew in office as minister for foreign affairs in the *Serrano* cabinet, shortly afterward ex-

changed his portfolio for that of the interior, and in August became president of the ministry. He retired from office at the accession of Alfonso XII., for a time was a leader without a party, as a member of the Cortes was finally associated with Martínez Campos (1881) in the organization of the new Liberal party, and upon the overthrow of the Conservatives became president of the ministry. He was forced from power in 1883. Subsequently he was president of the Cortes in 1883-4, and of the ministry in 1885-90 and 1892-5. In September 1897 he was again summoned to form a cabinet. He recalled Weyler from Cuba, appointed Blanco captain-general, and drafted a plan for Cuban autonomy. Although opposed to the war with the United States, he waged it with such efficiency as his limited resources would permit, and was loudly denounced for signing the treaty of peace. On 4 March 1899 he resigned with his entire cabinet, though on 6 March 1901 he again took the helm, and, after averting a Carlist insurrection, remained in office until 3 Dec. 1902. He has been characterized as "singularly devoid of the blind arrogance which has been the bane of so many Spanish statesmen." After Canovas' death, he was conceded to be the greatest political figure of Spain.

Sage, saj, Henry William, American philanthropist: b. Middletown, Conn., 13 Jan. 1814; d. Ithaca, N. Y., 17 Sept. 1897. In 1832 he engaged in the lumber business which he conducted until 1854, and settling at Ithaca, N. Y., entered the New York Assembly in 1847. His earlier benefactions were the endowment of various schools and churches, the West Bay City, Mich., public library, and the Lyman Beecher lectureship at Yale College. In 1870 he became a trustee of Cornell University and his various gifts to that institution were \$266,000 for the Sage College for Women; \$200,000 for the Sage School of Philosophy; \$50,000 for the Susan Lynn Sage chair of philosophy; \$260,000 with an additional endowment fund of \$300,000 for the University Library Building; \$20,000 for the Museum of Classical Archaeology; \$11,000 for the Sage professorship of philosophy; \$300,000 for floating indebtedness. His careful management of timber lands owned by the institution realized for it about \$6,000,000.

Sage, Russell, American capitalist: b. Verona Township, Oneida County, N. Y., 4 Aug. 1816; d. Lawrence Beach, L. I., 22 July 1906. He began life as clerk in his brother's grocery store; entered the retail grocery business for himself in 1837, and during 1839-57 was a wholesale grocer at Troy, N. Y. He was alderman of Troy in 1847; treasurer of Rensselaer County, and a Whig member of Congress during 1853-7. In 1863 he removed to New York and shortly began large operations in railroad and other securities. He accumulated one of the largest fortunes in America and was a director in many large corporations.

Sage, William, American novelist, son of Abby Sage Richardson (q.v.): b. Manchester 8 May 1864. He was educated in France and Germany, was engaged in railway and banking business 1881-96, and since then has given his attention to literature. He has published 'Robert Tournay' (1900); 'The Claybornes' (1902); 'Frenchy—The Story of a Gentleman.'

Sage, a name covering both the common garden herb (*Salvia officinalis*) and other plants of diverse families, somewhat resembling it in color or odor. The cultivated sage is a labiate, and the genus differs from the majority of *Labiate*, in having two stamens instead of four. It is a native of southern Europe, is a shrubby perennial of hoary aspect, bearing rough, wrinkled, gray-green, opposite leaves, on the decumbent stems, and pale-blue, streaked flowers in verticillate spikes at the extremities of the branches. It has been widely cultivated, for at least three centuries, on account of its aromatic odor, and bitter, pungent taste. It was formerly used in medicine, having slight tonic, stimulant, and astringent properties. An infusion of the plant, or "sage-tea," was drunk in England before the advent of Chinese *Thea*, was a favorite remedy for colds, and is even now employed as a gargle. An old English proverb states that "He that would live for aye must eat sage in May." See **HERBS, CULINARY**.

Many *salvias*, or sages, are frequently cultivated for their brilliant flowers. The most common, perhaps, are the scarlet sage or *salvia* (*Salvia splendens*) with racemes, perhaps a foot long, of slender flowers two inches long, arranged in whorls, both calyx and corolla being of a most brilliant scarlet hue; and the equally large-flowered but blue-tinted *S. patens*. The woolly white foliage of *S. argentea* has caused it to be included in gardens, and there are a score of others quite worthy of cultivation for ornament.

Several genera of the *Chenopodiaceae*, a family which takes kindly to alkaline soils, and which inhabit the desert regions of western North America, are called salt, sweet or silvery sages. Bitter sages are *Compositae*, and are more commonly known as sage-brush (q.v.). The salt sages are species of *Atriplex*, living on thousands of acres of waste lands, which are strongly impregnated with alkali, and so dry that little other vegetation can exist. Since water is so scarce in certain of these alkali deserts, stock can not be taken into them in summer, and the sages make a good growth, the fruits, valuable for their nutritive qualities, become ripened and the leaves "sun-cured," which, together with the tender spring shoots, make excellent forage, particularly for sheep. The flocks are taken in in winter, when the snow furnishes water for them, and eat the salt-bushes greedily, Nuttall's sage (*A. nuttallii*) being the most valuable, as it is perennial with a deep, woody root, and although cropped, seeds and all, quite down to the ground, survives and starts up again, during the summer, when it is undisturbed. In fact, the constant cropping of these pastures, and the constant manuring, are improving the winter ranges, which are thus becoming nearly as valuable as the summer ones. The sweet-sage or winter-fat (*Eurotia lanata*) is another highly prized winter forage plant, a foot or more high from a shrubby base, whitened with long hairs, perennial, and with abundant fruit, that contributes largely toward the great fattening qualities attributed to this sage, which is also supposed to have a beneficial effect on the grazing stock. The shad-scale, a spiny, shrubby salt-sage (*Atriplex confertifolia*) produces in the spring tender shoots and thick succulent leaves, and enormous quantities of flat, winged seeds. These are eag-

SAGE-BRUSH—SAGINAW BAY

erly sought at the time, and, in the autumn, when leaves and fruit have dropped, and been blown into hollows of the plain, the sheep seek them out, and devour them utterly.

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Sage-brush, any one of the species of the genus *Artemisia*—composites very abundant in the arid, alkaline regions of the Western United States, where the soil is not too saline, and, with other desert vegetation, covering immense areas. The best known sage-brush is the common shrub, or bitter-sage (*A. tridentata*), which is found growing on the plains, and ascending to the sub-alpine parks of the mountains. It varies in different situations from a dwarfed shrub to almost tree-like proportions, when its trunk near the ground will measure nearly a foot through, being twisted and knotty, and loosely enveloped in a light-gray, shreddy bark.

Sage-brush State, or Sage-hen State, a nickname for the State of Nevada, from the large amount of sage-brush growing there.

Saginaw, Mich., a city, and county-seat of Saginaw County, on the Saginaw River, 16 miles from Saginaw Bay, 97 miles northwest of Detroit, and 65 miles northeast of the capital at Lansing. The railroads entering the city are 6 divisions of the Pere Marquette, 3 divisions of the Michigan Central and 1 division of the Grand Trunk.

History.—The City of Saginaw is a consolidation of old Saginaw City, East Saginaw and the Village of Salina or South Saginaw. The latter was incorporated as a village in 1866 and became a part of East Saginaw in March 1873. East Saginaw was incorporated as a village in 1855 and as a city in 1859. Saginaw City was never incorporated as a village, its first incorporation being as a city in 1857. The two municipalities, East Saginaw and Saginaw City, were consolidated by act of the legislature of 1889 into the City of Saginaw, and the first meeting of the common council of the consolidated city was held March 12, 1890. The site upon which this prosperous community is located was first settled in 1815 by men of French origin and half breeds. The city comprises about seven square miles, the east side being 27 feet above the river and the west side 35 feet.

Government.—The form of government is by a mayor elected every two years and a council of 20 members, one from each of 20 wards, to serve for two years. Various city boards are appointed by the mayor subject to confirmation by the council.

Manufactures, Industries, Buildings, etc.—Saginaw was at one time the centre of the white pine industry, and millions of dollars worth of logs have been floated on the bosom of her river. This vast industry has of late years given way, in a measure, to manufacturing, and the city is now (1904) distinctively a manufacturing and jobbing centre. Some of the manufactures are beet sugar, plate glass, salt, iron and steel products, furniture, pianos and musical instruments, vehicles, baskets and a great variety of wood products, malt liquor and flour. It has planing mills, lumber assorting yards, brick yards, tanneries, graphite works and a variety of foundry and machine shops, in addition to the big shops of the Pere Marquette R.R. Co. The bituminous coal fields of Saginaw and vicinity employ 1,500 miners from the

city alone, and the pay roll is \$100,000 a month. The total number of wage earners in Saginaw is 26,000. According to the 1900 census, the number of manufacturing institutions in the city was 203, with a capital of \$26,703,000; number of employes, 6,858; annual wages paid, \$4,110,000; value of output, \$18,833,000. The assessed valuation of Saginaw for 1904 was \$23,971,068, and the net debt of the city was \$1,524,022, but this includes water bonds of \$500,000 on a water plant valued at \$1,000,000, which the city owns. The total expense for running the city for the year was \$420,861. The city has 58 miles of water mains and uses the Holly system of water supply, from two pumping stations, one on each side of the river. It has a fine sewerage system with 70 miles of sewers; 10 small parks; 54 miles of finely paved and beautifully kept streets, many of them laid with asphalt. The streets of the city are for the most part notable for their width. They are traversed by an excellent electric street railway system, and two interurban roads reach out into the surrounding country. The city has 46 church edifices and 5 missions. The hospitals are the Saginaw General Hospital, Saint Mary's Hospital, and the Woman's Hospital. Other charitable institutions are the Home for the Friendless, and Saint Vincent's Orphan Home. Fiduciary institutions are represented by 6 national and State banks, with a capitalization of \$700,000 and \$900,000 surplus and deposits of over \$10,000,000. Besides these, there are 2 private banks. Saginaw possesses a \$200,000 Manual Training School, and is also the seat of the Michigan Employment Institution for the Blind. It has the Hoyt Reference Library of 27,000 volumes, besides 2 other public circulating libraries. The educational system has at its head 2 finely equipped High Schools and the graded schools require 26 buildings, nearly all of the most modern character. There are in addition several private business colleges, the German Lutheran Theological Seminary, and 16 parish and parochial schools and academies. The city has one of the finest Masonic Temples in the State, a handsome Federal Building, 2 theatres and numerous capacious public halls. The east and west sides are connected by a number of fine bridges over the river, so that access is easily obtained from the business centre to the most remote parts of the city. In addition to the numerous small parks, the city has a large suburban resort, operated in connection with the street railway system. The population of Saginaw is cosmopolitan in character, the German possibly predominating, as attested by their numerous large and prosperous societies of an educational and social character. The Irish, French, and Bohemian are also conspicuous elements of the city's population, which, according to the census of 1910 is 50,510.

JOHN T. WINSHIP,
Editor 'Saginaw Evening News.'

Saginaw, a river in Michigan which is formed by the junction of the Flint and Shiawassee, and flows nearly due north into Saginaw Bay. The main stream is only about 30 miles long, but with its branches it drains a large portion of the Lower Peninsula. It is navigable to the city of Saginaw, 24 miles.

Saginaw Bay, the largest inlet of Lake Huron on the coast of the United States. It

SAGITTARIA.—SAGUNTUM

indents the east coast of the Lower Peninsula of Michigan. It is about 66 miles long and 30 miles wide. It is a safe harbor and never dangerously rough, although it is sometimes subject to storms. The color of the water is different from that of the open lake; it is a brownish-green.

Sagittaria, sāj-i-tā'ri-a, a genus of the water-plantain family (*Alismæ*). It is a widely distributed genus, wholly or partly aquatic, native to the temperate zones and the tropics. The species are handsome, with lance-like, elliptical or arrow-shaped leaves, erect or floating; the flowers are verticillate in trios around the upper part of the scapes, that carry them well above the water, and are 3-merous, with beautiful white and crinkled fugacious petals. The common arrow-head (*S. variabilis*), grows in the mud along rivers and ditches, and is very ornamental with its charming whorls of flowers rising from the centre of a cluster of large, erect sagittate leaves, varying surprisingly in different plants in respect to size and shape. It is a perennial, with thick fibrous rootstocks, which produce oval, fleshy tubers, often as large as a hen's egg, abounding in starch, and a staple and nutritious article of food with many Indian tribes. The squaws sometimes waded into the mud where the arrowheads grew thickly, loosened the tubers with their toes, and when the plants floated to the surface, captured them and flung them into canoes, to be boiled or roasted. *S. climensis* is cultivated in China for food.

Sagittarius, sāj-i-tā'ri-ūs, in astronomy, the ninth sign of the zodiac, into which the sun enters 22 November. The constellation consists of eight visible stars. It is represented on celestial globes and charts by the figure of a centaur in the act of shooting an arrow from his bow.

Sago, a farinaceous food, obtained from the central portion of various species of tropical palms, principally, however, from *Metroxylon rumphii*, or *M. lavenus*. The sago-palms flourish in wet soil, and are cultivated in the East Indies, and particularly in Sarawak. They are rarely over 30 feet high and have stout stems, with an outer rind about two inches thick, as hard as bamboo, but filled with spongy pith, containing a large proportion of starch.

The preparation of sago is one of the industries of the East Indies. The trees flower only once, and if allowed to do so, and to fruit, would exhaust the mass of starch stored in their stems, and then die, after propagating themselves either by seeds or by offshoots. To prevent this, the trees are felled when they are about 15 years old, and on the point of flowering. The starchy tissue, then most productive, is extracted, and pounded or grated to a powder. This is kneaded in water, in a cloth or sieve, the escaping water carrying the starch into a trough, where it is washed and settled out, until fit for use. The water is then drawn off, and the caked residue is ready for native cookery. This cake, or meal, when made into a paste and pressed through a sieve, forms fine pearly grains, which are left either in their original brownish hue, or are bleached, and compose the commercial product "pearl-sago."

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Sago-meal is eaten by the natives as pot-tage, or as biscuits, partially baked in earthen molds. It is not entirely soluble in hot water, as is ordinary starch, and can therefore be employed in making puddings, etc., forming a valuable article of food, as it is cheap, nutritious and easy of digestion. In Europe it is used for feeding stock, making starch, and by cocoa manufacturers for their beverages. Inferior qualities of sago are produced by *Phoenix farinifera*, *Corypha* of various species, *Caryota urens*, *Raphia flabelliformis*, and two South American palms.

Portland sago is a delicate farina extracted from the corm of the European wake-robin (*Arum maculatum*). Wild sago is the product of the coontie-root (*Zamia integrifolia*), a cycadaceous plant of Florida, well known as an article of food among the Seminoles; and other cycads, incorrectly called "sago-palms," furnish a coarse kind of sago.

Sagoin, sa-goin', or **Sagouin**, a French form of the native South American name of a genus (*Callithrix*) of Brazilian monkeys, of small size and remarkably light, active, and graceful in their movements.

Sa'goyewath'a. See RED JACKET.

Sagua la Grande, sā'gwā lā grān'dā, Cuba, town, province of Santa Clara; on the Sagua la Grande River; 150 miles east of Havana. It is connected by railroad with La Isabela, its port on the north coast, with Cienfuegos, Havana, and Matanzas, and with towns to the east; and carries on a considerable trade, sugar and molasses being the chief exports. Formerly gold was mined in the vicinity to some extent. It is well built, with wide and regular streets; among its public buildings are a hospital, a town hall, and a large church; it has also several schools.

Saguenay, sāg-ē-nā, Canada, a large river in the province of Quebec, emptying into the Saint Lawrence at Tadousac Harbor. It is about 100 miles long with a remarkable depth — 17 to 500 fathoms. It drains Lake Saint John and flows with almost unparalleled impetuosity, between high rocky walls and over deep precipices, forming numerous falls and cataracts in its upper course. Its magnificent scenery attracts many tourists. It is navigable for large vessels as far as Ha Ha Bay, 10 miles south of Chicoutimi.

Saguntum, sa-gūn'tūm, or **Murviedro**, Spain (*Hispania Tarraconensis*), situated near the mouth of the Palantias, three miles from the coast and 18 miles by rail from Valencia; was a rich commercial town in early times, especially famous for its figs and manufacture of a certain kind of pottery. The town was founded by Greek and Italian colonists. In the interval between the first and second Punic wars, it formed an alliance with the Romans, and became celebrated for the resistance it made to Hannibal in the siege of 219-18 B.C. The city was nearly destroyed at this time, but the Romans rebuilt it and made it a colony. The ancient city is now replaced by the modern Murviedro, and the only important ruins are those of the theatre. Pop. (1900) 6,784.

Sahara, sa-hā'ra, Africa, the great desert region in the north of the continent, extending from the Atlantic eastward as far as the Nile, and from the Mediterranean provinces to the Niger and Lake Tchad. Its area contains 3,459,500 square miles,—a region equal to the whole of Europe. The configuration is irregular and the surface highly diversified, reaching from 100 feet below the sea-level to an altitude of from 5,000 to 8,000 feet in Mount Tusidde. Some of the highest summits are those of the Ahaggar, a great mountain plateau. Air or Asben is an isolated mountain, midway between Tibesti and the Niger. Farther south is the extensive plateau of Adghagh. At the northeast in Fezzan are the dark mountains of Jebel es Sôda. The rest of the Sahara consists generally of undulating rocky surfaces and sand dunes interspersed with occasional oases. The date-palm flourishes on these green spots, also the olive tree. Apples, peaches, oranges, grapes, etc., grow and wheat, barley, rice, durra and other tropical crops are raised, and there is a considerable variety of flora. Mammals consist, outside of the domestic animals, such as camels, asses, black cattle, etc., of 15 species, comprising the jerboa, fox, jackal baboons, hyenas, mountain sheep, etc.; about 80 species of birds, among which is the ostrich. There are also tortoises, lizards, chameleons, serpents, such as the python, horned viper, etc. The edible frog and fish also occur. There is an important trade in silk tissues and mixed goods, ivory, ostrich feathers, gums, spices, musk, hides, gold dust, indigo, cotton, palm oil, kola nuts, silver, dates, salt, and alum. The exports are textiles, weapons, gunpowder, etc. Many thousand tons of phosphate are extracted. The range of temperature is very great. The chief centres of population are the oases. The inhabitants consist of Moors, Tuareg, Tibbu, Negroes, Arabs, and Jews; the former occupy the region between Fezzan and Lake Tchad. The tribes south of Algeria and Tunis. The Tuareg control the principal caravan routes. The Tibbu, who number about 200,000, live in the oases between Fezzan and Lake Tchad. The tribes of the desert are, generally speaking, camel drivers, slave and salt dealers, guides, and robbers. A few possess date-groves, but they usually subsist on the milk of their herds, bartering for fruits or grain. The principal caravan routes lead from Timbuktù to the Wady Draha, and to the oasis of Twat; from Haussa by Air or Asben and Ghat to Ghadames and Murzuk; from Bornu by Bilma and Murzuk to Tripoli; from Waday by Ojariga, Kufara, and Aujilah to Benghazi, and from Darfur to Siut. Pop. about 2,000,000.

Saháranpur, sa-hār-an-poor', or **Seharunpoor**, sê-hār-ün-poor', India, (1) capital of a district of the same name, in the United Provinces, 90 miles northeast of Delhi. It is an important railway junction. Among the buildings the most noteworthy are an old Rohilla fort (used as a court-house), and a fine Mohammedan mosque. The residential part is substantial and modern. There is a church, an American Presbyterian mission and a fine botanical garden for experiments in tea and cinchona. Commerce in grain, sugar, molasses

and country cloth is considerable. Pop. about 70,000.

(2) The district in the Meerut division has an area of 2,242 square miles, and occupies an alluvial table-land between the Ganges and the Jumna. It consists partly of wild, picturesque broken ground, but the larger portion is tillable. Cereals form the chief products, and its commercial importance is considerable. Pop. about 1,200,000.

Sahib, sâ'ib, the term of native address in India toward a respectable European. It is an Arabic word, signifying companion or lord. The feminine form is *Sahibâ*.

Sai, sâ'í, a Brazilian native name of indefinite application for a local monkey, most often, perhaps, designating the capuchin (*Cebus capucinus*).

Said Pasha, sâ-éd pash'a, Turkish statesman: b. 1835; d. Constantinople, 29 Oct. 1907. He commanded an army corps in the Russo-Turkish war, became governor of Cyprus, and was later appointed secretary of state. He was premier 1870-82, was grand vizier 1882-85 and was twice dismissed but reinstated by the sultan in 1883. In 1885-95 he was minister of foreign affairs, and subsequently president of the council of ministers.

Saiga, si'ga, an antelope (*Saiga tatarica*) found on the steppes of Russia and in western Asia. It is about 2½ feet high at the shoulders, pale bluish gray in color, and is remarkable for the greatly swollen appearance of the nose, due to the thick cartilaginous coverings of the nostrils. It once had a far wider habitat in Europe, and is steadily diminishing in range and numbers.

Saigon, si-gôn (Fr. si-gôn), or **Sai-gun**, Indo-China, the capital of Lower Cochinchina before the French conquest, is on the right bank of the Saigon or Dou-nai River, 34 miles from the sea. The town was nearly destroyed by the French, and the present city dates practically from 1861. It has fine public buildings, modern shaded streets, and zoological and botanical gardens; of educational institutions, the colleges of Chasseloup-Laubat and d'Adran are the most important. There is a large floating dock. The majority of the population is Asiatic, the Chinese element predominating. The town has an active trade with China, Siam, Singapore, and Java. Considerable French and English goods are imported. The main exports are rice, cotton, silk and hides. The great market is Cholon, 3½ miles from Saigon. Pop. about 80,000; Cholon, 127,000.

Sail, or **Sail-tailed Lizard**, a large agamoid lizard (*Lophurus amboinensis*) of the Philippines, Celebes, Java, and neighboring islands, which takes its name from the tall sail-like crest bone upon the upper surface of the tail of the adult, which is supported by a great lengthening of the spines of the vertebrae of that region; the tail otherwise is highly compressed, long and powerful. This lizard frequently exceeds three in feet in length, is olive-green spotted and marbled with black, and has many curious folds of skin about the neck. It is strong and active and spends much of its time in trees, but when alarmed or chased

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rushes for water, dives to the bottom and endeavors to hide among the stones. It is defenseless and harmless, and its flesh, which is white and tender, is much liked by the islanders.

Sail. See **SHIP**.

Sailcloth, a coarse, strong linen, cotton or hempen cloth used in making sails. The best is made of flax, and combines flexibility with lightness and strength. See **SHIP**.

Sailfish, a large predaceous fish (*Istiophorus nigricans*) of the West Indian and neighboring waters, which is closely allied to the sword-fishes and of the same family as the spear-fishes (*Tetrapturus*). It reaches a length of six feet, has an elongated, much compressed body, covered with elongate scutes, and a powerful, deeply forked tail; while the dorsal fin is, relatively, of huge size and deeply notched outline, well simulating the appearance of a ship under sail as it appears above the water when the fish glides along the surface as it frequently does. The bones of the nose are prolonged into a "sword," not so long as that of the swordfish, but sharper, and an effective weapon in a school of small fish.

Sailing. See **NAVIGATION**; **SHIPS**; **SAIL AND STEAM**.

Sailing Vessels. The first vessel of which history gives any description is the Ark, as built by Noah. Its proportions possess some interest, because, though not intended for a voyage, it may be inferred that it was constructed to float with as little motion as possible, considering that it "went upon the face of the waters" for about five months. Assuming a cubit to be about 21 inches, its length was 525 feet, its breadth 87 feet 6 inches, and its depth 52 feet 6 inches. Its length is thus seen to have been six times its breadth, which proportion is about an average of all types of vessels. Its draft of water must have varied greatly during the period of its occupation, as 12 months' provisions must have formed a very large proportion of the original weight, and these must have been gradually consumed. It had three decks; but was fitted with neither masts, sails, nor rudder.

Ancient History.—The paintings and sculptures, as the early records of Egypt, show regularly formed boats constructed of sawn planks of timber, propelled by numerous rowers, and also by sails. These vessels were long galleys with one mast and a large square sail, which was sometimes of linen and sometimes of papyrus. The Hebrews in the time of Solomon must have possessed vessels of considerable size, as mention is made in the sacred writings of that date of stately ships, and of voyages made to bring trees of considerable size to be used in the building of the temple. The Phœnicians were connected with the Hebrews in their maritime expeditions, and this people appear to have been the most enterprising in navigation of all the nations of antiquity. Herodotus tells us of their feat of circumnavigating the continent of Africa in 604 B.C. They started from the Red Sea, passing Ophir on east coast of Africa, then rounded the Cape, and keeping by the west shore they entered the Mediterranean Sea through the Straits of Gibraltar, and arrived in Egypt in the third

year of their expedition. Little doubt exists of the Phœnicians having been the discoverers of the art of sailing, as their skill in evading Nebuchadnezzar at the siege of Tyre for 13 years, shows that they possessed more than a superficial knowledge of navigation. They were also engaged in concert with other nations in wars with the Greeks; and it was from them the latter nation learned in their conflicts what they knew of ships and navigation. The fact of the Grecian mariners making use of the screw pump to discharge water from their vessels' holds, would lead to the conclusion that their vessels were no mere sloops. An evidence of the want of strength in the construction of these ancient vessels, is the fact of their being bound around the outside with heavy ropes. They were sometimes carried as part of the vessel's outfit, and used as necessity required. Out at sea and in heavy weather, there they were made use of. There were sometimes as many as 8 or 10 hands running fore and aft of the vessel.

Roman Galleys.—The Romans in the early stage of their history paid little attention to navigation, until it was forced upon them by the necessity of competing with their rivals, the Carthaginians. The galleys of this period ranged from a single bank up to five banks of oars. The oars in these large galleys were arranged in sets or banks, the number of these could be increased to any extent by giving increased length to the galley. The trireme, or three-bank galley, appears to have been generally open, in the waist where the rowers sat, with decks or platforms at both ends for the soldiers. The galleys of greater size than the three tiers, appear to have been always decked vessels. At the time of the first Punic war the Roman fleet is said to have consisted of 330 vessels, each containing 300 rowers and 120 soldiers. The triremes were each 105 feet long and 11 feet wide, and the quadriremes were 125 feet by 13 feet.

Merchant Ships.—It is generally supposed that ships intended only for merchant purposes were first built by the Genoese, and that not until the beginning of the 14th century were sails first used by that people. The fishing boats were the small beginning from which sprang the sailers and the larger sail vessels of a later period. In England, as early as 1344, many vessels of this character were in service. In the middle of the 15th century many large vessels were built in England. Prior to this the compass had come into more general use, and it was now possible to engage in longer voyages. The discovery of America and the passage around the Cape of Good Hope were early fruits of these improvements. The Portuguese employed vessels of small size in their voyages of discovery, but the Spaniards built larger vessels and long maintained a superiority in this respect. England was far behind the Peninsular nations in commercial enterprise at the opening of the 16th century; and at the close of the century the merchant marine was in a very depressed condition. Internal discords had put a damper on the enterprise of the merchants, and as the island was not yet famed for its manufactures, commerce drooped with every disaster to trade. The Dutch had monop-

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olized the East Indies trade and Holland bid fair to enrich herself at the expense of her neighbor. The British East Indies Company was formed, vessels built for the trade, and the merchants again prospered. (See SHIP.)

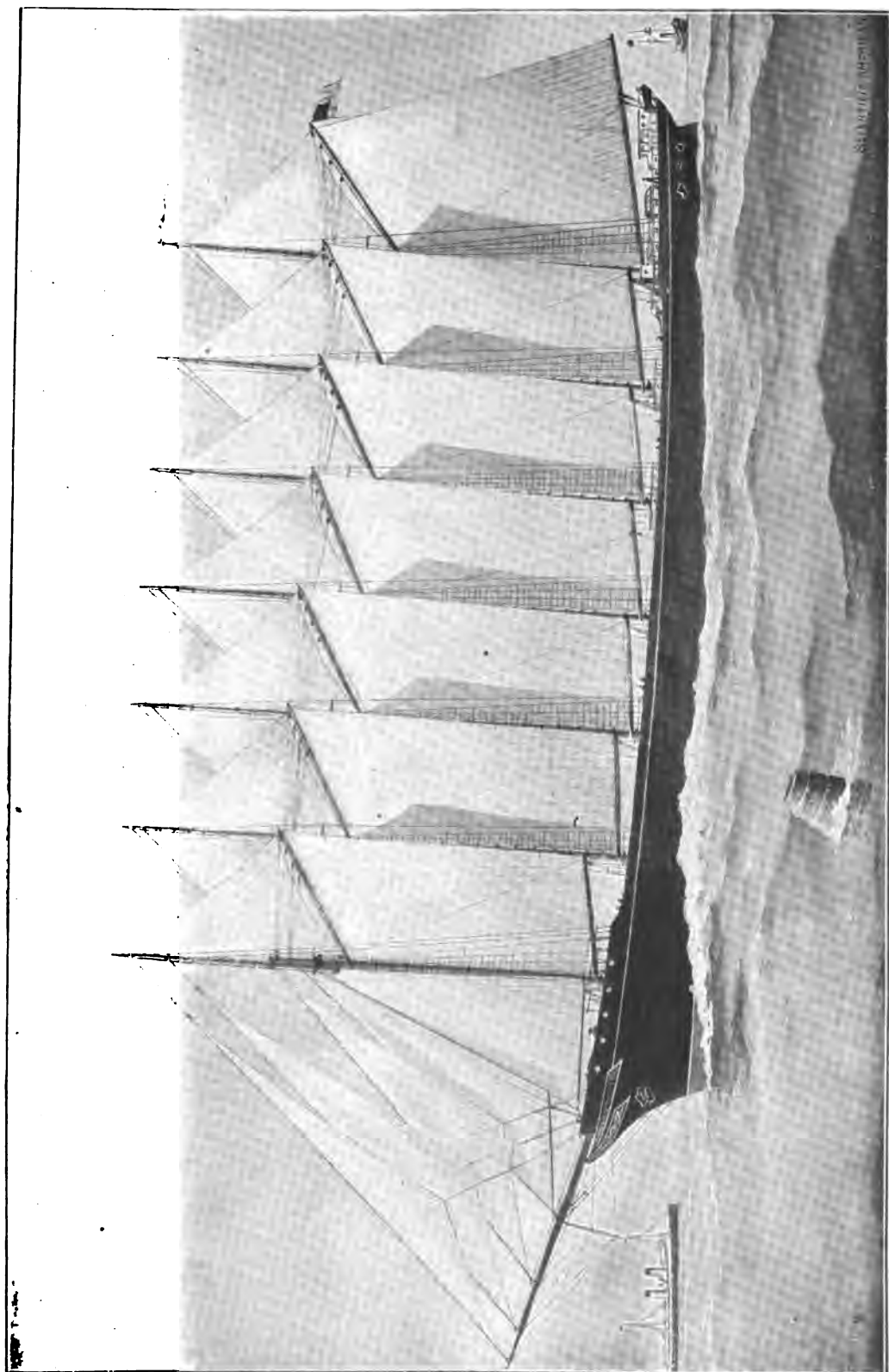
The First American Ships.—This continent having been fitted by nature in supplying it with an abundance of good timber, vessels have been built upon our shores from the first year of actual settlement. The first ship constructed was for the purpose of carrying a small band of settlers back to England, who were discouraged with their prospects after the first winter. The vessel was built at the mouth of the Kennebec River in Maine. It was a staunch and excellent little vessel, a two-master, named *Virginia*. She is believed to have been about 60 feet long and 17 feet beam and 10½ feet deep. The next vessel built was at New York in 1614 or 1615 by Captain Adrien Blok, who had lost his ship *Tiger* by fire while lying at Manhattan River. His new vessel was named *Onrust*, or *Restless*, and was 38 feet keel, 44½ feet long over all, and 11 feet beam. This vessel was employed for several years in exploring the Atlantic coast from the 38th to the 42d degree of latitude. Block Island was visited during one of the excursions, and took its name from Adrien Blok. With the exception of fishing boats and shallops, there is no record of the construction of any other boats until 1631. In that year the bark *Blessing of the Bay* was launched at Medford, Mass., for the use of the Massachusetts colony. In the course of the season this vessel made several coasting trips, and soon after visited Manhattan Island and Long Island. It is thought the vessel was lost with a load of furs and fish in 1633 off the capes of Virginia.

Early Shipbuilding.—Shipbuilding at this time appears to have received its first impulse from the same cause which threw the colonists upon their own resources for the supply of many of the necessities of life. They had been hitherto supplied with all but their corn and fish, by the many emigrant ships which had yearly added to their numbers. A suspension of this emigration was brought about by the civil wars in England, and the diminished intercourse caused thereby left them dependent on mercantile enterprise alone, which the state of navigation then rendered precarious in the extreme. Governor Winthrop then said, "The general fear, of the want of foreign commodities, now our money was gone, and things were like to go well in England, set us on work to provide shipping of our own: for which end Mr. Peter, being a man of very public spirit and singular activity for all occasions, procured some to join for building a ship at Salem of 300 tons, and the inhabitants of Boston, stirred up by his example, set upon the building of another at Boston of 150 tons. The work was hard to accomplish for want of money, etc., but our shipwrights were content to take such pay as the country could make." He speaks in another place of the *Trial* of 160 tons, as the first ship built at Boston. She sailed for Bilboa on 4 June 1642, laden with fish, "which she sold there at good rate, and from thence freighted to Malaga." Thus

early began the profitable trade to distant ports from New England. An early and successful prosecution of the business of shipbuilding could have been more reasonably expected of none of the first colonists of America, than of the settlers of Manhattan. Holland was at that period, and long after, in the enjoyment of the carrying trade of the world. Though not possessed of a foot of timber, she built and armed more ships than all the rest of Europe. Planted by this commercial people, and by merchants and capitalists of Amsterdam, then the mercantile metropolis of Europe, exclusively for the purposes of trade, it appears somewhat surprising that the facilities afforded by the new territory for shipbuilding were not made available to a greater extent by the parent nation. But the administration of a privileged mercantile association, such as the West India Company, which, in 1621, was invested with a monopoly of its trade, was unfavorable to the development of the resources of the colony. About 1630 the carrying trade between Holland and America, and the trade with Brazil, where the company had sustained losses equivalent to "one hundred tons of gold," were thrown open to the colonists, and private ships were for the first time entered at Amsterdam, and publicly advertised for New Netherlands. Other restrictions, which had fettered commerce, were soon after removed, and the trade of the world with the exception of that to the East Indies, and the trade in furs, were open to the colonists. In 1678 the shipping owned in the port consisted of three ships and fifteen sloops, and other small sailing vessels. In 1694 the shipping had increased to 60 ships and 102 sloops. This was on account of a monopoly of exporting flour and biscuits from the province. South of New York during colonial times, there was little or no construction of vessels. New England developed her large shipping interests through the fisheries, that were at her door, and the coasting trade maintained by the latter extended as far south as the West Indies during these early days. It might be said the fisheries were the cause of the large merchant marine of New England.

The Schooner.—In 1745 Andrew Robinson of Gloucester, Mass., built a vessel with a square stern, which was fitted with two masts, bearing a sloop sail on each, and a bowsprit with jib. She was sharp on the bottom, and on being launched, sped over the water so fast from the impetus gained by descending from the ways as to elicit from a bystander the remark, "See how she scoons." Scoon was a word used by plain people to express the skipping of a flat stone over the surface of the water when skillfully thrown; and the builder of the vessel, having been somewhat at a loss for a name for the new rig, seized upon the trifling incident and replied, "A scooner let her be," and two-masted vessels, with jibs, and fore and aft sails have since been called by that name. This vessel was probably used in the fisheries. The largest schooners were those sent to the Grand Banks, and for many years after 1800 about 70 sail vessels were sent annually to the Grand Banks, chiefly from Cape Ann. These early vessels were from 20 to 40 tons.

Colonial Merchant Marine.—Before the Revolutionary War our merchant marine was



THE FIRST SEVEN-MASTED STEEL SCHOONER.

Length, 395 feet; Beam, 50 feet; Molded Depth, 34 feet 5 inches; Displacement, 10,000 tons; Cargo Capacity 7,500 tons; Total Sail Area, 40,617 square feet.

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in a prosperous condition, and took nearly first rank with us. By 1760 from 300 to 400 trading vessels were being built annually in the different provinces. During the War of the Revolution the whaling and fishing fleets were almost annihilated by raids on the coast towns, by English cruisers. Foreign trade in our vessels suffered the same fate. A large part of the merchant and fishing fleet was employed during the war in privateering, and it became a profitable field for them at times, as small armed sloops frequently captured a large merchantman with the British flag. The larger privateers built during the war, when the conflict was over, were converted into merchantmen, and sent to the East Indies to trade. The Baltimore built schooner took high rank as a privateer during the war. The 16 years that followed ending with the War of 1812 were perilous times for American shipping. England excluded us from a profitable trade with the British West Indies, and the same interests led to the searching of our merchant vessels for British subjects, the capture and confiscation of our vessels and cargoes, and a detention of a large number of them for evasions of the British law. Then came on the War of 1812 that lasted for nearly three years, during which many privateers were constructed that subsequently pursued the peaceful pursuit of trade. A change in the form of our sailing vessels now began to appear, giving them better entrance lines, and cutting off those high poop decks that had been such a fixture on large vessels for many years, being among several changes that were made.

The Carrying Trade.—Prior to the War of 1812 our coastwise trade was carried on by no larger sailing vessels than those that were schooner rigged, while our foreign trade was most largely carried on in foreign bottoms. Before 1812 a few sailing packets, or vessels carrying both passengers and freight, were brought into the transportation business, and cleared from port on regular days in each month, and were operated between special points only. When the war ended there were only a few small British ships in the packet service between England and America, and very few between America and other parts of the world. Soon after the peace, however, a large number of lines came into existence as a natural outgrowth of the rush of emigration from Europe to America, and the general expansion of ocean travel and trade. The carrying of passengers was a profitable business, and there was considerable competition among shipping merchants to get the most business for their vessels. None but the best and finest vessels could be used in this trade, and the old-fashioned freighting vessels with their small cabins and houses, and poop decks, were subjected to many changes to adapt them to the passenger business. The merchants at most all our coastwise ports, from Portland, Maine, to New Orleans, La., soon saw the advantage of these packets for our coastwise trade, and regular established lines were soon in operation that remained as carriers until the coastwise steamship lines began operations in 1847, when these lines of sailing vessels gradually withdrew from business. In this trade brigs, schooners, and barks were used, while in the foreign service ships and barks only were placed in service.

Packet Lines.—It was at New York the packet business between Europe and America mainly centred. There were lines from other ports, but New York was the pioneer, always kept the lead, and had the largest number and finest vessels for the service. In 1816 Isaac Wright & Co., of New York, founded the famous Black Ball Line, so called from the round black dot in a white field, which was adopted as the pennant of the ships. There were at first four vessels in this line, each of 400 to 500 tons, and named "Pacific," "Amity," "James Cropper," and "William Thompson." This line was subsequently owned by Goodhue & Co., Charles H. Marshall, and others. They were placed in the Liverpool trade, and sailed once a month at first, and during the first nine years the average time in voyages to Liverpool was 23 days, and for returning home 40 days, but one of the later ships, the Canada, once made the outward voyage in 15 days and 18 hours. A London line followed the Black Ball line, and then a Havre line was started. In 1821 a second Liverpool line was established from New York by Byrnes, Trimble & Co., known as the Red Star line, consisting of the Manhattan, Hercules, Panther, and Meteor, sailing once a month, and soon after Fish, Grinnell & Co., afterward Grinnell, Minturn & Co., founded the Swallow Tail line with four packets, making from New York at this time one sailing for Liverpool each week. In 1830 the passenger fare in the cabin from Liverpool was \$180, including beds, bedding, wines and stores of every description. The London packets now sailed twice a month, and the Havre line had three sailings a month. There were also at this time sailing packets to South America and Mexican ports. In 1830 there were 1,510 arrivals at New York from foreign ports, of which 382 were ships, 28 barks, 714 brigs, 376 schooners, 8 sloops, 1 ketch, and 1 felucca. Of these 1,366 were American, 92 British, 7 Spanish, 12 Swedish, 2 Hamburg, 5 French, 8 Bremen, 6 Haitian, 9 Danish, 2 Brazilian, 2 Dutch, and 1 Portuguese. The number of arrivals in 1829 was 1,310, and passengers, 16,064. In 1823 John Griswold established a London line of four vessels, that had been increased by 1837 to 12 vessels. These vessels down to 1845 were one- or two-decked vessels, and had increased in size to 900 or 1,000 tons. The between deck space, aft, was divided into cabins for the passengers, the middle portion was fitted up with kitchens, pantries, etc. The steerage passengers and crew were placed forward. After 1830 there were frequent sailings of rival packets, transient, but all American, from Boston, New York, and Philadelphia to Great Britain and other parts of Europe. All the ships sailed with great speed, and made the run across the Atlantic in excellent time. The Red Jacket once ran from New York to Liverpool in 13 days 11½ hours. The Mary Whitebridge made the voyage from Baltimore in 13 days 7 hours; but the usual time was 19, 20, or 21 days to Liverpool, and from 30 to 35 days homeward. English steamers were sent out in 1838 and 1840 to compete with these packet lines; but the steamers did not at first make much better average time on a voyage than the packets, but in the course of a few years the increase in speed and their additional carrying capacity

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gave them an advantage, and the packets could no longer successfully compete with them.

Clipper Ships.—After the packets came the clipper ships, vessels intended primarily for freighting, and built to secure the highest possible speed when laden with cargo. The packets were the fast sailers from 1816 to 1845, but after the latter date there grew up various branches of trade in which a quick delivery was as important for commercial purposes as it was for the passenger trade. For instance there was the tea trade from China to the United States, in which speed has always been considered essential. The cargoes consisted of teas, spices, coffee, dried fruits, etc., which were liable to deteriorate in a long voyage of four months to the home port, and to shorten the voyage as much as possible was desirable for many reasons. There were no telegraph lines and ocean cables in those days, and the uncertainty of the markets made fast trips home from the East Indies very important. Merchants had repeatedly suffered heavy loss, sometimes business ruin by the decline in eastern goods brought home by ships during their absence on the voyage out and back, and good ships were therefore always required in that trade. The first clippers were built at New York. The pioneer was the *Helena*, built by William H. Webb, whose dimensions were 135 feet length on deck, 30 feet 6 inches beam, and 20 feet depth of hold. She came out in 1841, and was constructed for A. and N. Griswold for the China trade. She was a good sea boat and a very fast sailer for her day, making many fast voyages between China and other East Indian countries, and New York. Following the *Helena* came the *Rainbow* of 750 tons, built by Smith and Dimon in 1843 for Howland and Aspinwall. This vessel made the voyage to Canton and return home in six months and 14 days, having spent three weeks of the time in loading and discharging cargo. The *Helena* and the *Rainbow* brought about a great change in this type of vessel. They commanded better prices for freights than slow ships, and in every way proved desirable. Then in 1844 followed the *Montauk* of 540 tons for William S. Wetmore, built by William H. Webb. Then A. A. Low & Co. had Brown & Bell construct for them the *Howqua* of 706 tons, a very fast and fine vessel, which made a voyage from Shanghai to New York in 87 days. The owners of the *Rainbow* then had the noted clipper *Sea Witch* built of 907 tons by Smith & Dimon, with the intention to have the fastest vessel of the type afloat. This vessel had finer under water lines than her predecessors, and may be said to have been the first of that advanced type of fast clipper ships. She made one voyage to California in 97 days. The era of fast clipper ships was now fairly inaugurated, and many of this class were now built not only at New York, but at Boston, Philadelphia, and Baltimore. Nearly all the early ones did not exceed 1,000 tons register, or about 165 feet long, but competition led to a great increase in size, and every year saw vessels launched that spread more and more canvas, longer, larger, and faster than ever, and expressly intended to excel everything that had preceded them in the merchant shipping of the world. In 10 years after the first clipper ship

the size of 2,400 tons was reached, and there were many built of 2,000 tons each.

British Rivalry.—Foreign merchants were by no means idle spectators of what was going on in this country, and in 1846 England began to awake to the new and dangerous rivalry from America. Alex. Hall & Co. of Aberdeen made a specialty of clipper ships, and there were launched from their yard many superior and famous vessels. But the Americans, though hard pressed, were able to maintain the lead, and entitled to the best record ever made by ships sailing under canvas. There were several famous races home from China. Once the British clippers *Chrysolite* and *Stornaway*, and the American clippers *Race Horse*, *Surprise*, and *Challenge* engaged in a race from Canton to Liverpool and Deal, and arrived at the home ports as follows: At Liverpool, *Chrysolite* in 106 days; at Deal, *Stornaway* in 109 days; *Challenge* in 105 days; *Surprise* in 106 days. The British ship *Challenge* ran from Shanghai to Deal in 113 days, and the American clipper *Nightingale* in 110 days. These races were claimed by both parties; but the Americans kept the reputation of superiority, and several ships were ordered at our ship yards for foreign account. Then shortly after the gold fever broke out in California, and the John Bertram of 1,100 tons was built at Boston, Mass., and sent to the Pacific coast in 1850 by Boston parties. This was the first clipper ship built for the California trade. The *Witch of the Wave* and four others of 1,500 tons each, were immediately after built for the same parties.

Sailing Speed.—The speed of the clippers was remarkable. Six miles an hour was a good average rate of speed for long voyages, and nine miles an hour excellent time, especially for a ship loaded with a full cargo of merchandise. Clippers ran across the Atlantic to Liverpool at an average speed of nine miles an hour, spurring at the rate of from 10 to 13 miles with a favorable wind, and on voyages that gave them the advantage of the trade winds they ran for days and weeks in succession at an average speed of from 12 to 15 miles an hour. To sail 300 miles a day was not exceptional. The largest of them all was the *Great Republic*, built by Donald McKay in 1853 at East Boston. The length on load line was 314 feet, beam molded 49¼ feet, molded depth 32 feet. One of the noted clippers of the day was the *Dreadnought* built in 1853 at Newburyport, Mass. In 1859 she made the voyage from Sandy Hook to Liverpool in 13 days and 8 hours, and in 1860 from Sandy Hook to Queens-town in 9 days and 17 hours. After 1860 there was no longer any necessity for great size and speed in this type of vessel. Too many ships had been built, and a reaction set in that lasted for many years. By 1857 there were from 80 to 100 large ships in the California trade, and the rates of freight fell off one half, and the ships were thrown into the general trade of the world. In the next place, steam vessels, about 1852, had been built to run on all the principal ocean routes, and there was no longer any need for sailing vessels to be fitted out with large cabins and roomy passenger accommodations. This ended the career of those fast clipper ships that had such a world-wide reputation from

SAILOR'S CHOICE—SAILOR'S CREEK

1850 to 1860. Then the Civil War came on, and our foreign trade was cut off for four years. After 1865 the grain trade attracted the larger sailing vessels. This type of vessel was no longer an extreme clipper of the former period, but a handsome, medium clipper, of about 2,000 tons register, capable of carrying a large cargo at a fair rate of speed. These vessels continued in the Atlantic-Pacific trade until the American Hawaiian Steamship Line commenced operations, in 1900.

Modern Schooners.—The schooner, as previously mentioned, was the product of a comparatively early date. It was largely used in the coastwise trade, to the West Indies, to South America, and later to Africa, and it may be said has not fallen from favor even to this day. The early vessels were not over on an average, 75 tons. When it became necessary to increase the tonnage of the vessel it was thought to be advantageous to increase the power, so three masts were adopted. The earliest date of the building of a three-masted schooner in this country is thought to be about 1831. There were a few more built about 1845, and in 1847 the *Midas* was converted into a three-masted schooner, the *Zachary Taylor* was built at Philadelphia in 1849, and the *Spray* at Wilmington, Del., the same year. The period when this type of sailing vessel had passed the experimental stage appears to have been in 1853 when there were built the *Gardner Pike*, the *James H. Chadbourne*, the *Kate Brigham*, and the *E. R. Bennett*; and in 1855 the *Eckford Webb*, and the *William L. Burroughs*; and in 1856 the *Hartstem* and the *Cordelia*. The two latter were two-deck vessels, and were the largest of the type built for some years. These vessels were used mainly in our coasting trade, as far south as the Gulf of Mexico ports. There were a few more built prior to 1860; the Civil War came on when but few, if any, were built. It was 1868 before three-masted schooners were again constructed, and by 1873 they were the most popular type of our coastwise sailing vessels. The first four-masted schooner was the *William L. White* built at Bath, Maine, and completed in June 1880. The Northern lakes also had four-masters immediately after the *William L. White*. Then it was some years before the pioneer five-master was constructed in 1888 at Waldoboro, Maine, as the *Governor Ames*. The latter was the largest schooner for 12 years, until the *George W. Wells* was built in 1900 as a six-masted schooner. The largest of them all is the *Thomas W. Lawson*, built of steel in 1902, as a seven-masted schooner.

Iron Hull Ships.—The first iron hull sailing vessel constructed in the United States was the schooner *Mahlon Betts* of 275 tons, built in 1854 at Wilmington, Del. Then there were none but wooden sailing vessels until the brig *Novelty* was built at Boston, Mass., in 1868, and the bark *Iron Age* constructed in 1869 for *Tupper & Beattie* of New York. The sloop yacht *Vindex* was then built in 1871 at Chester, Pa., by *Reanie Son and Archbold*; and in 1879 the yacht *Mischief* was built at Wilmington, Del. The three-masted schooner *Josephine* followed in 1880, being built by *William Cramp & Sons Co.* Then there came much larger vessels in

the *Tillie E. Starbuck*, built in 1883 by *John Roach & Son* at Chester, Pa.; and in the same year by *Gorringe & Co.*, as the *American Ship-building Company*, the *T. F. Oakes*. These vessels were about 2,000 tons register each. See also NAVAL CONSTRUCTION; SHIP-BUILDING.

J. H. MORRISON,

Author of 'History of American Steam Navigation.'

Sailor's Choice, the name of several excellent food fishes taken on the eastern and south-eastern coasts of the United States, which are of small size and belong to the family of grunts. The best known, probably, is *Orthopristis chrysopterus*, also called pigfish, and especially common in the Gulf of Mexico, which is regarded as the best pan-fish of the region.

Sailor's Creek, Battle of, the last great battle of the Civil War in the East. Sheridan says that it was "one of the severest conflicts of the war . . . so overshadowed by the stirring events of the surrender, three days later, that the battle has never been accorded the prominence it deserves." When Gen. Lee abandoned Richmond and Petersburg on the night of 2 April 1865, he ordered the concentration of his army at Amelia Court House, about 30 miles west of Petersburg, and it had collected at that point by noon of the 5th. On the night of the 5th Sheridan's cavalry and the Second, Fifth, and Sixth corps of the Army of the Potomac were at or near Jetersville, under orders to march early next morning on Amelia Court House. Gen. Meade began the advance at 8:30 A.M., and when four miles out of Jetersville, Humphreys' Second corps, on the left, discovered that Lee was moving westward, passing by the flank of the Union army. The advance on Amelia Court House was suspended, and the army faced about; the Second corps was ordered to move on Deatonville; the Fifth through Painesville, on the right of the Second; and the Sixth through Jetersville to the left of the Second. Sheridan's cavalry moved on the extreme left parallel to the Confederate line of retreat, impeding the march of the column wherever practicable, but Longstreet's corps succeeded in reaching Rice's Station, on the Lynchburg road, where he awaited the corps of R. H. Anderson, Ewell, and John B. Gordon, the last-named commanding the rear-guard. The Second corps was checked at Flat Creek by the destruction of the bridge, but, soon repairing it, overtook Gordon and kept up a running fight with him for 14 miles, carrying several lightly intrenched positions, and capturing prisoners, colors, and wagons. The pursuit continued to Parkinson's Mill, on Sailor's Creek, where Gordon made a stand, but was soon driven across the creek, losing three guns, 13 colors, several hundred prisoners, and a large part of the trains of Lee's army. He attempted another stand beyond the creek, but fell back as Humphreys crossed, and marched for High Bridge. Pursuit ended at night. During the day the Second corps had captured 1,700 prisoners, four guns, 13 colors, and several hundred wagons and ambulances. While the Second corps was engaging Gordon, the Sixth corps, with the cavalry commands of Merritt and Crook, had come up some three miles to the left and overthrown the corps of R. H. Anderson and Ewell. Custer's division had interposed between Ewell and

SAILOR'S SNUG HARBOR—SAINT

Gordon, destroying 400 wagons and taking prisoners and 16 guns; and Crook, moving rapidly to the left, found R. H. Anderson's command posted on high ground behind breastworks running across the Rice's Station road, and sent a dismounted brigade to take possession of and form across the road, thus cutting Anderson off from Longstreet. Ewell now proposed to Anderson that they make their way through the woods, around Sheridan's left, and get to Longstreet; but before anything could be done both were attacked. The Sixth corps had opened its artillery upon Ewell's 3,600 men, to which there was no reply, as Ewell was without artillery; and about 5 P.M. two divisions advanced, crossed Sailor's Creek, and attacked Ewell, who made a most determined resistance and, massing his troops, broke the centre of the Union line, but was checked by the artillery-fire from beyond the creek. The two divisions of the Sixth corps—Seymour's and Wheaton's—wheeled to the left and right respectively, enveloping Ewell's flanks; Stagg's cavalry brigade charged his right; and at the same time Merritt's and Crook's cavalry charged and routed R. H. Anderson's 6,300 men, killing, wounding, and capturing about 2,600. Ewell, now completely cut off and surrounded, surrendered his entire command. About 250 men of Kershaw's division, serving with him, escaped. Seven general officers were included in the surrender. The total loss of Lee's army was not less than 8,000 men. The Union loss did not exceed 900. Longstreet, who had remained at Rice's Station during the day, waiting for Anderson, Ewell, and Gordon, to unite with him, marched as soon as night set in, with Fields', Heth's, and Wilcox's divisions, for Farmville. (See FARMVILLE AND HIGH BRIDGE.) Consult: 'Official Records,' Vol. XLVI.; Humphreys, 'The Virginia Campaign of 1864-5'; Walker, 'History of the Second Army Corps'; Grant, 'Personal Memoirs,' Vol. II.; Sheridan, 'Personal Memoirs,' Vol. II.

E. A. CARMAN.

Sailors' Snug Harbor, a home for aged sailors on Staten Island, N. Y., established by Captain Richard Randall in 1800. The home is under government supervision and is in charge of a naval commander.

Sainfoin, *sân'foin*, or **Asperset**, a leguminous plant (*Onobrychis sativa*), originating in the Mediterranean countries, but which has been cultivated for centuries. The stem is about two feet high, with pinnate leaves, composed of small leaflets; the pea-like flowers are rather large and of a showy pink color, and are disposed in short spikes, on long axillary peduncles. It is a nutritious fodder, well liked by live-stock, especially sheep, makes good hay, and will grow on light, warm, chalky soils, where other pasturage does not thrive; the roots are long-lived and are useful for binding light soils, while the foliage not only shades the pastures, but makes a good crop for plowing under. It is also recommended as a honey-producing plant for bee pastures.

Saint, a person eminent for piety and other virtues. In the books of Scripture, both the Old and the New Testament, the whole body of the faithful people are called saints (2 Chron. vi. 41; Ps. xxxi. 3; Hebr. xiii. 14, "Salute all the saints"; Eph. i. 1, "the saints at Ephesus.") It is customary to give the title

saint to all the apostles, evangelists and other holy persons, men and women, named in the New Testament, to most of the Fathers of the Church, to all the martyrs. In the Church of Rome the title of saint is formally and authoritatively bestowed on servants of God who in their lifetime were eminent for their Christian virtues and graces, and whose sanctity has been proved by miracles after their death (see CANONIZATION; BEATIFICATION); but thousands of saints are honored by that church, who lived in early times before the process of canonization was thought of. Intercession by the saints in heaven and Invocation of the Saints are articles of belief in the Catholic Church, Eastern and Western, as also in the schismatical eastern churches; but that doctrine is repudiated by all the Protestant churches. The teaching of the Church of Rome, as proclaimed by the Council of Trent, is that the saints reigning with Christ "offer to God their prayers on behalf of men"; that it is good and useful "to call upon them with supplication," and, in order to obtain benefits from God through Jesus Christ, "to have recourse to their prayers, help and aid": here the church's doctrine regarding both intercession and invocation of saints is defined. Catholic divines find full warrant for this belief in the Christian sacred books; for the doctrine of intercession, in 1 Cor. xii. 12, where the unity of the Christian society is enforced; in James v. 16, where the prayer of the righteous is lauded; in Eph. vi. 18, and 1 Tim. ii. 1, where Saint Paul sets such store on the prayers of his fellow Christians; and it is asked, Can it be that the souls which have gone to God no longer exercise this kind of charity for their brethren on earth? If Scripture were silent on this question, the practice of the Church in all ages would suffice to remove all doubt as to the Apostolic origin of the belief in the intercession of saints. For the doctrine of the invocation of saints, theologians quote the word of Jesus Christ, that the angels in heaven rejoice when a sinner repents of his sin (Luke xv. 7): it were superfluous to cite the usage of the Catholic Church regarding invocation of saints: it began with the beginning of Christianity itself.

Saint Agnes, Sisters of; **S. Ann**, Sisters of; **S. Augustine**, Sisters of; **S. Benedict**, Sisters of; **S. Bridget**, Sisters of; **S. Charles Borromeo** Congregation; **S. Dominic**, Sisters of; **S. Francis Seraphicus**, Poor Brothers of; **S. Francis** Sisterhood; **S. Gabriel**, Brothers of; **S. Januarius**, Order of; **S. John of Jerusalem**, Knights of; **S. John the Baptist**, Sisters of; **S. John the Evangelist**, Sisters of; **S. John of God**, Order of; **S. John the Evangelist**, Society of; **S. Joseph** Sisterhood; **S. Joseph of Nazareth**, Sisterhood of; **S. Joseph**, Order of; **S. Margaret**, Sisters of; **S. Martha**, Sister-Servants of; **S. Mary**, Sisters of; **S. Mary and All Saints**, Sisters of; **S. Mary** Sisterhood; **Saint Maur**, Congregation of; **S. Monica**, Sisters of; **S. Patrick**, Order of; **S. Saviour**, Sisters of; **S. Vanne**, Congregation of; **S. Viateur**, Clerics of; **S. Vincent de Paul**, Society of. See ORDERS, RELIGIOUS.

Saint Andrew, Order of; **S. Benoit** of Aviz, Order of; **S. Catherine**, Order of; **S. Cecilia**, Order of; **S. Charles**, Order of; **S.**

SAINT ALBANS—SAINT ANDREWS

Elizabeth, Order of; S. Faustin, Order of; S. Ferdinand, Military Order of; S. George, Order of; S. George Constantinian, Order of; S. Gregory the Great, Order of; S. Henry, Order of; S. Hermengild, Order of; S. Hubert, Order of; S. Isabelle, Order of; S. Lazare, Order of; S. Louis, Order of; S. Michael, Order of; S. Michael and S. George, Order of; S. Olaf, Order of; S. Sava, Order of; S. Stanislas, Order of; S. Stephen of Hungary, Order of; S. Sylvester, Order of; S. Vladimir, Order of. See **ORDERS, ROYAL**.

Saint Albans, *âl'banz*, England, in Hertfordshire, 20 miles northwest of London, an ancient borough and market-town, standing on a height above the river Ver. Its abbey is one of the most remarkable Christian temples in England. Only a gateway remains of the original abbey, built in 796, in honor of Saint Alban, the first British Christian martyr. The present abbey has been so often extended and altered that it represents in its architecture many styles and various epochs of history, from the time of the Romans to that of Henry VII. It has the form of a Latin cross, with a length of 547 feet, and breadth of 206 feet. Its tower has an elevation of 146 feet, crowned with battlements. Other churches are Saint Michael's 10th century; Saint Stephen's, with some good Norman features, and Saint Peter's, whose nave is of the Early Perpendicular. There is an Edward VI. grammar school; and of modern buildings those deserving notice are the corn exchange, court-house, prison, baths, and public library, besides benevolent institutions, including hospital and almshouses. The chief industries are silk manufacture, straw-plaiting, and there are breweries and iron foundries. Two battles were fought between the houses of York and Lancaster, near Saint Albans; in that of 1455 Richard, Duke of York, defeated Henry VI., and in 1461, Margaret of Anjou, defeated the army of York, commanded by Warwick. Southwest of the present city stood the ancient Verulamium, one of the oldest towns in Britain, on Watling Street. In the abbey the printing press was set up on which the first English translation of the Bible was printed. Nicholas Breakspear, the only English pope, was born near Saint Albans. Pop. about 17,000.

Saint Albans, Vt., city, county-seat of Franklin County; on the Central Vermont railroad; in the northwestern part of the State, about 60 miles north-northwest of Montpelier, the State capital, and three miles from Lake Champlain. It was settled in 1763 and chartered as a city in 1897. In 1864 the town was raided by a band of Confederates who entered the United States from Canada. In 1866 a number of Fenians who were planning an invasion of Canada, made Saint Albans their headquarters.

The city is on a plain about 390 feet above sea-level and 373 feet above lake-level. The scenery is most pleasing; to the east are the Green Mountains, and on the west may be seen the Adirondacks. The city is in an agricultural region in which considerable attention is given to dairying. The chief manufacturing establishments are creameries, railroad shops,

machine shops, and flour and grist mills. There are large shipments of farm and dairy products. Saint Albans contains the Warner Hospital, the Warner Home, Villa Barlow Convent, an academy; Saint Mary's Academy, public and parish elementary schools, and a public library. Pop. (1890) 7,771; (1900) 6,239. Since 1890 a part only of the town has been chartered as a city. The population is, according to the 1910 census, 6,381.

Saint Albans (Vt.), Confederate Raid on, a foray made 19 Oct. 1864, when Lieut. Bennett H. Young, with about 25 Confederates, nearly all of them escaped prisoners, armed with revolvers and carrying chemical preparations with which to set fire to town and farm-houses, crossed the Canada line into the town intending to burn it and rob the banks. Several citizens were killed or wounded, and three banks robbed of \$150,000. An attempt to burn the town failed because of the defective character of the chemical preparations. Young and his party remained in town less than an hour, when they rode back to Canada on horses they had seized. Pursuit was made by United States troops, who captured some of the men on Canadian soil and turned them over to the authorities, by whom they were released on the technical ground of want of jurisdiction.

Saint Andrews, *än'drooz*, Scotland, an ancient city of Fifeshire, on the North Sea, 11 miles southeast of Dundee and 31 miles northeast of Edinburgh. It was created a royal burgh by David I. in 1140, and after having been an episcopal see became an archiepiscopal see in 1472; it was long the ecclesiastical capital of Scotland. The ruined cathedral was begun in 1160 and took 157 years to finish. The old castle, also in ruins, was founded about 1200, and rebuilt in the 14th century; in it James III. was born, Cardinal Beaton assassinated, and in front of it George Wishart was burned. Saint Andrews was a celebrated educational centre as early as 1120; its university, the first in Scotland, dates from 1411; it consists of the united colleges of Saint Salvator and Saint Leonard and the college of Saint Mary, both at Saint Andrews, and embraces also University College, Dundee, founded in 1880. The united college of Saint Salvator and Saint Leonard has a principal (also principal of the university) and 11 professors, and the college of Saint Mary has a principal and three professors. Degrees, open to women as well as men, are conferred in arts, divinity, science, medicine, and law, much as in the other Scottish universities; and the university also confers the diploma and title of L.L.A. (Lady Literate in Arts). The number of students is about 250. In connection with the university is a library containing about 100,000 printed volumes and 150 MSS. The university unites with that of Edinburgh in sending a member to Parliament. Madras College or Academy, founded by Dr. Bell of Madras, the principal secondary school of the place, provides accommodation for upward of 1,500 scholars. Saint Andrews is a popular watering place and summer resort, and the headquarters of Scottish golf, its links being famous. The manufacture of golf clubs and balls is a thriving industry.

SAINT ANDREW'S CROSS — SAINT AUGUSTINE

Saint Andrew's Cross. See Cross.

Saint Angelo Castle, Rome, Italy, a famous fortress situated on the right bank of the Tiber in the northwestern part of the city, opposite the bridge of Saint Angelo, and a short distance from the main buildings of the Vatican. It was built by the Emperor Hadrian as a tomb for himself and his family. Originally it was a round stone tower covered with marble and surmounted by a number of statues, which, together with the marble covering, have disappeared, leaving the bare stone structure. When the Goths besieged Rome it was used as a fortress, and has served this purpose ever since, being held and garrisoned by the party in power in the city. Since the time of Innocent III. it has belonged to the popes, who strengthened the fortifications with outworks, and connected the castle with the Vatican by an underground passage.

Saint Arnaud, sǎn-tār-nō, Jacques Leroy de, French soldier: b. Bordeaux, France, 20 Aug. 1796; d. at sea 29 Sept. 1854. He entered the French army in 1813, but in 1822-31 was engaged with the Greeks in their struggle for independence. He returned to the French army in 1831, and in 1837 he went to Algeria, where he rose to the rank of *maréchal-de-camp* in 1847, and general of division in 1851, in recognition of his successful warfare against the Kabyle tribes. He was appointed minister of war 26 Oct. 1851, was active in promoting the *coup d'état* of 2 December, and was made a marshal of France in that month. He was placed in command of the French forces in the Crimean war and co-operated with Lord Raglan at the battle of Alma, 20 Sept. 1854. Consult Duperré Sainte-Marie, 'M. le Général Leroy de Saint-Arnaud' (1852).

Saint Asaph, ǎz'af, Wales, an episcopal city in the County of Flint, six miles southeast of Rhyl, occupies an eminence in the Vale of Clwyd, near the confluence of the Clwyd and Elwy. It is built irregularly and has a venerable appearance. The encampment, Bron-y-Wylva, on the brow of the hill, is supposed to have been occupied by Roman forces. The cathedral, a small plain structure, dating from 1284, has been restored several times. Its library contains some rare and valuable books. The bishop's palace is modern. The town has a grammar school, founded 1600, county offices, a union workhouse and almshouses. Pop. about 18,000.

Saint Aubain, sǎn-tō-bǎn, Nicolai de, Danish author, known largely by his pseudonym, 'KARL BERNHARD': b. Copenhagen 18 Nov. 1798; d. there 25 Nov. 1865. He first appeared in literature as a contributor to the 'Flyvende Post,' and finally obtained a large measure of success by his works of fiction, of which several dealt with higher Danish circles in modern times, while others were drawn from events of Danish history. Among the titles are: 'Lykkens Yndling' ('Fortune's Favorite'); 'Krøniker fra Christian den Andens Tid' ('Chronicles from the Time of Christian II.,' 1847), and 'Krøniker fra Erik of Pomerens Tid' ('Chronicles from the Time of Erik of Pomerania,' 1850). A collection of his writings appeared at Copenhagen in 1856-66 (2d ed. 1869-71).

Saint Aubyn, ǎ'bĭn, Alan, pseudonym of FRANCES MARSHALL BRIDGES, English novelist: b. Surrey. She was the daughter of G. B. Bridges, a dramatist, and was married to Matthew Marshall of Saint Aubyns, Tiverton, Devonshire. Among her very numerous novels may be named 'The Master of St. Benedicts'; 'Broken Lights'; 'A Prick of Conscience'; 'The Junior Dean.' She has also written many juvenile tales such as 'Joseph and His Little Coat'; 'The Dean's Little Daughter'; 'Wapping Old Stairs.'

Saint Augustine, ǎ'gŭs-tĕn or ǎ-gŭs'tĕn, Fla., city, port of entry, county-seat of Saint Johns County; on the Atlantic coast, about 38 miles south of the mouth of the Saint Johns River. The city is in lat. 29° 48' 30" N., and lon. 81° 35' W. It is on a peninsula formed by the Saint Sebastian River on the south and west and the Matanzas River on the east. It is on the Florida East Coast railroad. The city has many evidences of its ancient fortifications. The residence of the old Spanish governors is now a custom-house and post-office. The principal streets extend north and south. The main thoroughfare, Saint George Street, only 17 feet wide, extends through the centre of the city to the city gateway; but beyond this point it is called San Marco Avenue. Treasury Street, which crosses Saint George, is only seven feet wide at the east end. Of the modern buildings, the hotels are the most beautiful. The Ponce de Leon is of the style of the Spanish Renaissance; the buildings and furnishings cost about \$2,100,000. A pictorial history of Spanish adventure in the New World, especially relating to the history of Florida, is given in the mural decorations of the dining room and loggia.

Saint Augustine was settled 8 Sept. 1565 by Spaniards under Pedro Menéndez de Aviles; but the place had been visited as early as 1512 by Ponce de Leon. For two centuries it remained under Spanish rule, although in 1586 it was plundered by Drake. The population in 1763 was 3,000, besides the garrison of 2,500. It became a British possession in 1763, which it remained until 1783. During the Revolution it was an important military depot. It became again a Spanish possession in 1783 and in 1821 it was ceded to the United States (see FLORIDA). Some of the old buildings of the first Spanish régime are still in existence. The houses were then built chiefly of coquina, a formation found on Anastasia Island, a concrete made of broken shells cemented with shell-lime. The sea-wall, the city walls, and the fort were made of the same material. San Marco, now Fort Marion, is a fine specimen of the knowledge of military engineering of that age. The Government added a water battery in 1842-3, and has made occasional repairs, but it stands to-day about as when built by the Spaniards. It is said to have been built by Mexican convicts and Indian prisoners, and to have been in process of erection for about 100 years. The shaft of marble in the Plaza was erected in 1812-13 to commemorate the adoption of a Spanish constitution which was more liberal than the one under which the city had been governed. The inhabitants were ordered to destroy the shaft when the project failed, but the authorities only removed the tablets which have since been restored. A Roman Catholic Church begun in 1793 and used later as a cathedral, was burned in 1887; but the façade remained almost unin-

ST. AUGUSTINE



1. The Old City Gate.

2. The Plaza.

SAINT BARTHOLOMEW—SAINT BRANDAN'S ISLE

jured. In rebuilding, this front wall was incorporated into the new structure; and the bell bearing the date of 1682 is also preserved. The only part of the old wall which now remains is the city gateway with about 30 feet of the wall on each side. The wall extended south along San Sebastian River, and from the river to the castle of San Marco (Fort Marion) where were a wall and moat. The old city extended nearly a mile, from the Castle of San Marco to the Franciscan Convent, now Saint Francis barracks, and the old sea-wall, built to protect the city from the sea, was also limited by the castle and the convent. The Government rebuilt the sea-wall in 1837-43, and there is now a granite coping three feet in width. For many years, until 1817, the entrance to the city from the mainland was by means of a drawbridge.

There are a number of manufacturing industries; chief among the establishments are the Florida East Coast railroad shops, which have about 200 employees; printing plant, 75 employees; lumber and wood works, 60. There are engaged in oyster canning and in fishing fully 250 persons. Saint Augustine is a famous winter resort; about 25,000 persons visit the city annually. Two fine hospitals, the Alicia and the Florida East Coast, several churches, and the municipal buildings are among the principal buildings. The educational institutions are Saint Joseph's Academy, Warden Academy (colored), three public schools (white), two parish schools (white), one parish school (colored), one kindergarten, and one of the 17 best libraries in the United States, entitled to all Government publications free, and a museum of natural history. The one bank has a capital of \$100,000; the annual amount of business is \$1,100,000. The government is vested in a mayor and a council of 10 members, five of whom are elected each year. Pop. (1910) 5,494.

D. E. THOMPSON,
General Manager 'The Evening Record.'

Saint Bartholomew, bār-thōl'ō-mū, or **Saint Barthélemy**, sǎn bār-tāl-mē, West Indies, an island 190 miles east of Porto Rico. It is about eight square miles in extent, of irregular form, and mountainous. Although nearly treeless it is fertile; vegetables are cultivated in some of the valleys, and bananas, cassia, tamarinds, and sassafras are exported. Rocks and shallows make access to the island difficult for any but the larger coasting craft. Lead and zinc ores have been found in the island but are not worked. The principal town is Gustavia, near the port. The island belonged to Sweden, but in 1877 was sold to the French who had previously held it from 1648 to 1748; the people, who had retained French language and customs, desiring it. Slavery was abolished in 1848. Pop. 2,942.

Saint Bartholomew, Massacre of. See BARTHOLOMEW, SAINT, MASSACRE OF.

Saint Bede College, a Roman Catholic institution, in Peru, Ill., opened in 1891, and in charge of the Order of Saint Benedict. In 1902-3 there were connected with the school 18 professors and instructors, 194 students, of whom 174 were in the collegiate department. The courses are preparatory, commercial, and classical. The classical course is intended for those studying for the priesthood or for the professions.

Saint Benedict's College, located at Atchison, Kan. It was founded in 1853 by the Benedictine Fathers. There are two distinct courses offered, the classical and the commercial; the classical course leads to the degree of bachelor of arts, the degree of master of arts is conferred for two years' post-graduate study. The commercial course leads to the degree of master of accounts. There is also a preparatory course provided. There are two scholarships for those who enter the classical course. The college has two distinct libraries, one for the free use of the students, numbering 4,000 volumes in 1904, and one for the special use of the professors, numbering 15,000 volumes in 1910. The number of students in 1909-10 was 245, of members of the faculty, 26; the total number of graduates from the opening of the college was about 400.

Saint Bernard of Clairvaux. See BERNARD, SAINT.

Saint Bernard' Dog, a race of large dogs which gets its name from the Hospice of Saint Bernard, where it has long been kept by the monks to aid them in rescuing perishing travelers. This dog is very valuable in assisting the monks to keep to the line of the road and in finding their way back. They are seldom burdened. Dogs of other races are used for the same purpose in other parts of the Alps. The Saint Bernard dog is of two varieties: the first, which has long white hair with black or tawny spots being few in number. This famous dog, according to the traditions of the monastery, is the result of a cross between a Danish bull-bitch and a mastiff, a native hill dog, though at what time effected it is impossible to say. After the breed was once established it was kept pure till 1812. About 1860 these dogs first attracted the attention of English travelers, who imported them to Great Britain, where they were exhibited and at once excited much notice on account of their size and beauty. Others were introduced, and the Saint Bernard was soon established as the most popular big dog, a popularity which has gone on increasing. The Saint Bernard, as bred to modern English ideas, is an immense red or orange colored dog, marked with white on muzzle, neck, chest, feet, and tip of tail. The head should be massive and imposing, with a strong square muzzle, a point of great importance. Legs should be straight, with large feet, and double or, at least, single dew claws. Hind feet should turn out, though not sufficiently to hinder the dog's movements. The coat of the rough variety is of medium length; it should not be too curly. In the smooth variety the coat should be short and wiry. Many of the finest Saint Bernards measure over 30 inches high at the shoulder and weigh over 150 pounds. While most of these dogs are good-tempered, strangers should be cautious in dealing with them; they are very likely to attack and kill small pet dogs, especially fox-terriers.

Saint Bran'dan's Isle, a legendary island supposed to have existed to the southwest of the Canary Islands and to have been discovered by the Irish monk, Saint Brandan, and 75 brother monks in the 6th century, after seven years spent in search for the land of saints. This legend is traceable as far back as the 11th century. Each of the various early geographers gives it a different location. The legend had some influence upon the discovery of America.

SAINT CATHARINES—SAINT CHRISTOPHER

Saint Catharines, Canada, county town of Lincoln County, Ontario, on the Welland Canal and on the Grand Trunk and Niagara, Saint C., and Tor. railways; 12 miles northwest of Niagara Falls, 32 miles east of Hamilton. Saint Catharines is noted for its mineral wells, has large hotels, and is in a picturesque and fertile region. It has important manufactures of agricultural implements, sewing machines, foundry products, saws, edge tools, furniture; flour, saw, and planing mills, ship yards, tanneries, woolen factories, and breweries. Saint Catharines also carries on an extensive fruit trade. It has good water and sewerage systems, gas and electric lights, banks, and newspapers. The more noted local institutions are Bishop Ridley College, a marine hospital, and a commercial college. Pop. about 10,000.

Saint Chamond, *săi shā-môn*, France, in the department of Loire, eight miles northeast of Saint Etienne by rail, at the confluence of the Gier and Janon, is a well-built manufacturing city. There are large coal mines in the vicinity, famous dye-works, and extensive metallurgical manufactures, and various other industrial works, including large mills for the manufacture of silk, lace, etc. The remains of a Roman aqueduct are found at Saint Chamond. Pop. about 17,000.

Saint Charles (Ark.), Engagement at, a battle of the Civil War, fought in Arkansas County on the White River, 17 June 1862. On 10 June Capt. C. H. Davis, then in command of the Federal Mississippi flotilla, received a request from Gen. Halleck to open up the White River for communication; he accordingly despatched a force under Commander Kilty, consisting of the ironclads Mound City and Saint Louis, and the wooden gunboats Lexington and Conestoga. Meanwhile the Confederates had fortified the bluffs at Saint Charles and, on learning of the approach of the Union vessels, had sunk their gunboat Maurepas across the channel and transferred her guns to the shore-battery. On 17 June a detachment of Federal troops landed below the bluffs, and the gunboats opened the attack upon the Confederate position, the Mound City leading; when she was within 600 yards of the shore a 42-pound shell entered her casemate and exploded her steam-drum; badly crippled she was towed out of action by the Conestoga, and the other boats continued the attack. The commanding officer of the land forces very shortly signaled them to stop firing, and the troops successfully stormed the Confederate battery. The Confederate loss was 6 killed, 1 wounded, and 8 missing; the most serious Federal loss was on the Mound City, the majority of her crew being killed by the escaping steam, or in consequence of jumping into the river. Of 175, only 3 officers and 22 men were saved. As there were no Confederate works farther up the river, this action gave control of the White River to the Federals. Consult: Mahan, 'The Gulf and Inland Waters,' p. 50; 'Battles and Leaders of the Civil War,' Vol. III., pp. 552-3.

Saint Charles, Mo., city, county-seat of Saint Charles County; on the Missouri River, 20 miles from its mouth, and on the Wabash, the Missouri, K. & T. R.R.'s; about 18 miles

northwest of Saint Louis. It was settled in 1765 by Blanchette "Chasseur," incorporated in 1795, and chartered as a city in 1805. There is an electric road connecting Saint Charles with Saint Louis. The city is in an agricultural region, in which the chief products are wheat and corn. The principal manufacturing establishments are car works in which there are 1,800 persons employed and flour mills. The city has large grain elevators, tobacco factories, and a foundry and machine shop. The principal public buildings are a court-house, 10 churches, the schools, and Saint Joseph's Hospital. The educational institutions are Sacred Heart Academy, opened in 1818; Saint Charles Military College, opened in 1838; Lindenwood College, opened in 1830; a high school, public and parish elementary schools, private schools, and four libraries. The three banks have a combined capital of \$150,000, and the annual amount of business is about \$1,400,000. The government is vested in a mayor and a council of eight members, elected biennially. Pop. (1890) 6,161; (1900) 7,982; (1910) 9,437.

PERCY ALEXANDER,
Editor 'Banner News.'

Saint Charles College, at Ellicott City, Md.; founded 11 July 1831, under the auspices of the Roman Catholic Church. The funds for the institution were donated by Charles Carroll of Carrollton, one of the signers of the Declaration of Independence, who gave 253 acres of land from his own domain, and \$5,349 in money. The charter of the school as agreed upon by Archbishop Maréchal of Baltimore and Charles Carroll, stipulated that the purpose of the school was "the education of pious young men of the Catholic persuasion for the ministry of the gospel," and that the legal administration of the college should be entrusted to five trustees, who must be citizens of the United States. The founder also requested that the trustees be members of the Society of Saint Sulpice. The school was not opened until October 1848. The faculty then consisted of the president, one assistant and four students. At the present date (1910) the faculty numbers 15, the students 173. The total number that have matriculated is 4,000; and about 1,400 have been ordained priests. The grounds have been improved and a number of fine buildings supply all needful space. Saint Charles College forms the classical department of Saint Mary's University and Theological Seminary of Saint Sulpice, at Baltimore. The course including the preparatory work is six years. The college has power to grant degrees. There are three libraries; the main one has about 16,000 volumes; the library connected with the reading room has 5,000 volumes, and the library for the Juniors is in their own part of the college. Several scholarships are available on competitive examination.

Saint Christopher, popularly **Saint Kitts**, West Indies, 45 miles northwest of Guadeloupe, is an island belonging to the Leeward group, and a British possession. Its area is 68 square miles; its length 23 miles, breadth five miles. It is traversed by a rugged range whose highest summit, Mount Misery, has an altitude of 4,100 feet. Basse-Terre, the capital, on the coast, has a population of about 7,000. It is united administratively with Nevis, and the small island Anguila. The chief products are sugar, mo-

SAINT CLAIR—SAINT CLOUD

lasses, rum, salt, some coffee, tobacco, and cattle. The island was discovered in 1493 by Columbus; colonized by the French and British simultaneously in 1625, and held by those nations alternately for some time, passing over entirely to England in 1713.

Saint Clair, Arthur, American soldier: b. Edinburgh, Scotland, 1734; d. Greensburg, Pa., 31 Aug. 1818. He was a grandson of the Earl of Roslyn and was educated at the University of Edinburgh, after which he studied medicine. He came to America with the fleet of Admiral Boscawin and took part in the capture of Louisbourg and of Quebec. In 1762 he resigned his commission of lieutenant and two years later established a home and a manufacturing industry in Ligonier Valley, Pa. He became prominent in his vicinity and held several civil offices. In 1775 he was made colonel of militia; and on 9 Aug. 1776 was appointed brigadier-general and was ordered by Washington to organize the New Jersey militia. He fought at Trenton and Princeton, and having been appointed major-general in 1777, succeeded General Gates in command at Ticonderoga. At the approach of Burgoyne, with a force more than three times outnumbering his, he evacuated the fort on account of his inability to protect all the exposed points. A part of his force was attacked and defeated at Hubbardton. For this disaster he was tried in court-martial in 1778, but acquitted of the charges brought against him. He commanded a body of troops in 1781-2 under General Greene in the South; was a delegate to the Continental Congress in 1785-7 and its president in 1787. He was appointed first governor of the Northwest Territory in 1789, and was appointed commander-in-chief of the forces engaged in warfare with the Indians in 1791, but was defeated on 4 November, near the Miami villages. In March of the following year he resigned his commission and in 1802 President Jefferson relieved him of the governorship of the territory. He published a narrative of the manner in which the campaign against the Indians in the year 1791 was conducted under the command of Maj.-Gen. St. Clair with his observations on the statements of the Secretary of War (1812). Consult: W. H. Smith, *The Life and Public Services of Arthur St. Clair* (1882).

Saint Clair, Mich., city in Saint Clair County; on Saint Clair River at the mouth of the Pine River, and on the Michigan Central railroad; about 43 miles northeast of Detroit and 12 miles south of Port Huron. A ferry connects the city with Courtwright on the Canadian side of the river. It is in an agricultural region and has considerable manufacturing interests. The chief industrial establishments are lumber mills, sash, door, and blind factories, ship-yards, salt works, brick works, iron works, foundry, tannery, and brewery. There is a good system of waterworks, several well built churches and schools. Pop. (1890) 2,353; (1900) 2,543; (1910) 2,633.

Saint Clair, Pa., borough in Schuylkill County; on Mill Creek, and on the Philadelphia & Reading railroad; five miles north of Pottsville. An electric railroad connects the borough with Pottsville. It is in an anthracite region, and the chief industries are connected

with mining and shipping coal. It has machine shops, a foundry, a tool factory, large coal and brick yards, and a large mining implement works. There are a high school, public and parish schools, a private school, and a library. There is a large trade in coal. Pop. (1890) 3,680; (1900) 4,638; (1910) 6,455.

Saint Clair, a lake on the boundary between Michigan and Canada, and between Lake Huron and Lake Erie. It receives the waters of Lake Huron through Saint Clair River and discharges its waters into Lake Erie through Detroit River. It is about 30 miles long, from north to south; its maximum width is 24 miles and the average width 12 miles; area, 396 square miles. It is about 3 feet higher than Lake Erie and 5.4 feet lower than Lake Huron. The northern part is shallow, owing to the sediment from Saint Clair River; the average depth of the central part is 19 feet. The bed is covered with a blue mud, with sand and gravel in some parts, all supporting a dense growth of low vegetation in which are many forms of animal life. The lake is noted for the large number of steamers and the enormous tonnage which it carries each year.

Saint Clair, a river called originally Sinclair, in honor of Patrick Sinclair, a British officer, who in 1765 purchased from the Indians, a tract of land along the river. The river is the outlet of Lake Huron, and discharges its waters by several channels into Lake Saint Clair. The delta at the mouth is known as the Saint Clair Flats. A number of summer cottages and hotels have been built on the Flats. One of the channels has been improved for navigation; a canal about one and one half miles long has been built at such an angle as to shorten the course, and of such a width and depth as to admit large lake steamers. A railroad tunnel under the river connects Port Huron (q.v.) in the United States with Sarnia (q.v.) in Canada. It is nearly two miles long, including approaches, and was opened for travel in 1891. The river is about 41 miles long.

Saint Cloud, *sân-kloo*, France, in the department of Seine-et-Oise, on a height near the Seine, seven miles west of Paris, is charmingly situated and especially interesting for its historical associations. It commands a superb view of Paris, and the beautiful shady park, with its chateau and elegant fountains, is a favorite resort of Parisians. Within the precincts of Saint Cloud are situated the new national Sèvres porcelain manufactory. The chateau was built by Gondi in 1572, purchased by the Duke of Orléans, the brother of Louis XIV. in 1658, and by Louis XVI. for Marie Antoinette in 1782. Henry III. was murdered in the old mansion by Clement 21 Aug. 1589. Peter the Great was received there in 1717. It was the scene of Napoleon's coup of 18th Brumaire, and his favorite residence; here he caused himself to be declared first consul, and here Blücher had his headquarters (1815). At Saint Cloud, Charles X. (1830) affixed his signature to the ordinances which doomed him. Napoleon III. signed here the declaration of war against Prussia (1870).

Saint Cloud, *klowd*, Minn., city, county-seat of Stearns County; on the Mississippi River, and on the Northern P. and the Great

SAINT CROIX — SAINT DIZIER

N. R.R.s; about 65 miles north of Minneapolis, two miles below the mouth of the Sauk River. It was settled in 1852 by Ole Bergeson, incorporated in March 1856, and became a city in 1868. In the vicinity are extensive granite quarries. The city has good water-power and a number of manufactories. There is a large surrounding region in which are productive farms. The chief manufacturing establishments are flour mills, foundries, machine shops, wood working factories and railroad shops. There are large grain elevators, stock yards, and several well built business houses. There is considerable trade in granite, farm products, flour and wood work.

Saint Cloud has the Minnesota State Reformatory Prison, Saint Raphael's Hospital, and Saint Joseph's Home for the Aged. The educational institutions are a State normal school, Saint Clotilde's Academy of Music, five public schools, three Roman Catholic parish schools, and a library. The five banks have a capital of \$300,000. The government is vested in a mayor and a council of 15 members, three of whom are elected each year. Pop. (1890) 7,686; (1900) 8,663; (1910) 10,600. C. F. MACDONALD,

Editor 'Daily Times.'

Saint Croix (sometimes called **SCHOODIC**), (1) a river, the outlet of Grand Lake, flows south, east-southeast, and forms part of the boundary between Maine and New Brunswick. It flows into Passamaquoddy Bay. It is 75 miles long; navigable as far as Calais, Maine, above which there is extensive waterpower. (2) A river which has its rise in Douglas County, Wis., flows southwest to the Minnesota border, then south, forming the boundary between Wisconsin and Minnesota for a distance of about 100 miles, entering Mississippi River at Prescott, Wis. It is about 150 miles long and navigable to the Falls or the Dalles, a distance of 54 miles from its mouth. At the Falls there is a descent of 50 feet in 900 feet, and below there is a cañon.

Saint-Cyr, **Laurent Gouvion**, lă-rôn goo-vê-ôn sãn sêr, **MARQUIS DE**, marshal of France: b. Toul, France, 13 April 1764; d. Hyères, France, 17 March 1830. In 1792 he entered the army and attached to the staff of General Custine. He was rapidly promoted and in 1796 commanded the centre division in the army on the Rhine under Moreau. He was appointed to the command of the army of Italy in 1798 where he re-established discipline, the army having been on the verge of revolt against their general, Masséna. He returned to the army of Moreau in 1799, was victorious at Biberach in 1800, and in 1801 was sent to Spain to command the army which was to invade Portugal. After the treaty of peace was signed he became ambassador at Madrid. He participated in the Prussian and Polish campaigns of 1807, and in 1808 was in command in Catalonia, where he relieved Barcelona. In 1811 he was assigned to the command of a corps in the Russian campaign. He was victorious at Polosk in 1812 and was created marshal of France in recognition of his services. He made a brilliant fight at Dresden, but was forced to capitulate and remained a prisoner in Hungary for some time. After the Restoration he was created a peer of France, was appointed minister of war in 1815, minister of marine in 1817 and a few months

later minister of war again, retiring in 1819. He wrote: 'Journal des Opérations de l'Armée de Catalogne en 1808 et 1809' (1821); 'Mémoires' (1829-31); etc. Consult De Vernon, 'Vie de Maréchal Gouvion Saint-Cyr' (1857).

Saint Cyr, or **Saint Cyr-l'École**, lă-kol, France, a village near Paris, west of Versailles, at the end of the old park of Louis XIV, celebrated for its military school. Madame de Maintenon founded here (1686) a seminary for the education of the daughters of families of high rank in reduced circumstances. The convent chapel contained the tomb of Madame de Maintenon, and Racine's 'Esther' and 'Athalie' were written for the pupils of the school and first acted there. During the Revolution this institution was abolished, and in 1806 Napoleon transferred to Saint Cyr the famous military academy which he had founded at Fontainebleau. Two advanced forts of the new enceinte around Paris are situated at Saint Cyr. Pop. 2,835.

Saint Denis, sãn dê-nê, France, in the department of Seine, 4½ miles north of Paris, is an important junction on the Northern railroad. The town is especially celebrated for its venerable abbey, from which it derives its name; the two high towers are respectively Romanesque and Gothic; the rose window dates from the 13th century. The abbey was the burial place of the kings of France and in the chapels of the nave are the tombs of Louis XII., and Anne of Brittany (1591); of Henry II.; Catherine de' Medici; of Louis of Orleans; of Francis I.; and Claude of France—one of the splendid tombs of the Renaissance; and that of Dagobert, one of the most curious of mediæval (13th century) works of art. The crypt dates partly from the time of Charlemagne. In the centre is the vault, where the last king reposes—Louis XVIII., the only one whose ashes have been respected. The crypt also contains the Bourbon vault, where repose Louis XVI. and Marie Antoinette. Modern features deserving notice are an orphanage (1886), the monument commemorative of the Revolution and other public statues, and the railway station. In 1888 the old Hotel Dieu was converted into a hospital for old men.

Saint-Denis, the capital of the French island of Réunion in the Indian Ocean, on the north coast of the island. It is built on a long, narrow beach shut off on the land side by a range of high volcanic mountains. In the city are a cathedral, a palace for the governor, a theatre, and a large number of educational institutions, including a lyceum, several large schools, a library, a museum, and a botanical garden. The harbor is an open roadstead exposed to frequent severe storms, but a new, protected harbor has been constructed at Pointe des Gallets, a few miles to the west, which is connected with the city by a railroad. Pop. about 35,000, chiefly French creoles.

Saint Dizier, sãn dê-zê-ă (ancient **DESMENT FANUM**), France, department of Haute-Marne, on the Marne, 35 miles southeast of Châlons. Part of the old castle is standing and the church has some peculiar Gothic windows. There is a library and a museum. It is an important centre of the iron trade, with foundries of iron, steel, copper and bronze, engineering works,

etc. It is a railway station. In 1544 Saint Dizier was besieged and taken by Charles V., although strongly fortified. In 1814 there was severe fighting nearby, between Napoleon and the Allies. The walls have been razed and the site now constitutes the promenade of the town. Pop. about 15,000.

Saint Eli'as, Mount, in Alaska, in the southeastern part of the Territory; lon. 140° 55' 47.3" W.; lat. 60° 17' 35.1" N. The United States Coast and Geodetic Survey report the height 18,100 feet above sea-level. It rises from an elevation of considerable height, and the foot-hills on the south side are covered with trees. The timber line is from 2,000 to 2,500 feet above sea-level. The mountain itself is covered with snow and ice and has many glaciers. The south side is almost perpendicular; the storms of ages and the avalanches have removed many of its rugged features. The north side is more accessible, and has been explored to some extent. The Malaspina Glacier (area 1,500 square miles) is at the foot of Mount Saint Elias, near Yakutat Bay.

Saint Elmo Castle, Naples, Italy, a fortress crowning a rocky hill on the western outskirts of the city. It was built by Robert the Wise in 1343. It has massive walls surrounded by fosses cut out of the solid rock, and was long held to be impregnable. It is now used as a military prison.

Saint Elmo's Fire. See **ELMO'S FIRE, SAINT**.

Saint Etienne, sǎn tǎ-tě-ên, France, a manufacturing town in the department of the Loire, on the Furens, 32 miles southwest of Lyons. It is located amid some of the richest coal fields of France. The important buildings include the old abbey of Valbenoite, dating partly from the 13th century, a Protestant church, a synagogue, a town house, a school of mines with fine collections, and an art palace, with a museum and library, rich in old MSS., collections of natural history, and of ancient artillery. The enormous metallurgical establishments yield one third of the whole French production of steel, manufactured according to the Bessemer and Martin processes, the national gun factory and other metal works; the manufacture of hemp cables, pottery and lime, the weaving of ribbon, laces, trimmings, etc., and conditioning of silk are among the varied and active industries of the town, giving employment to thousands of men and women. The collieries are very extensive, employing alone 15,000 miners, while 80,000 work in the ribbon factories, 16,000 work in heavy iron goods, hardware 7,000, military and naval material, etc., 6,000.

Saint Eustatius, ũ-stǎ-shĭ-ŭs, or **Saint Eustache**, sǎn-tě-stǎsh, an island of the Dutch West Indies, lying south-southeast of Porto Rico, 12 miles northwest of Saint Christopher. It consists of two volcanoes with an intervening valley, and covers an area of eight square miles. Sugar, cotton, maize, yams, potatoes, and above all tobacco are cultivated. Yarns and sweet potatoes are exported. The only landing is protected by two forts. The Dutch acquired the island in 1600, colonizing it in 1635. It suffered many vicissitudes at various periods under English and French occupation, but in 1814 was finally restored to the Dutch. Orange-

town is the only town. Earthquakes are frequent. It has a salubrious climate. Pop. about 2,000; mostly nègres.

Saint-Evremond, sǎn-tǎvr-môn, **Charles de Marguetel de Saint Denis**, French courtier and author: b. Saint Denis du Guast 1 April 1613; d. England 20 Sept. 1703. He was educated by the Jesuits, entered the army about 1629 and served in the Thirty Years' war. He was a witty and accomplished courtier, and was for a time a favorite with Condé and also with the king; but incurred their displeasure by his sarcastic raillery and especially by his letter on the Peace of the Pyrenees. In 1662 he went to England, where he became a favorite at court and received a pension of £300 (\$1,500) from Charles II. He wrote dramas, essays and letters, his collected works being published in 1705. These include 'Sir Politics,' written with Buckingham.

Saint Francis, a river which rises in eastern Missouri and flows into the Mississippi River in Arkansas, lat. 34° 45' N. It is a large river, and was formerly navigable 300 miles for large keel boats; but the earthquakes of 1811-12 raised its channel so much, and so irregularly, as to cause the waters to overflow the banks and form a vast number of lakes and swamps along its former course. At high water the river is still navigable at some seasons of the year for about 150 miles; and there are several settlements about 70 miles from its mouth. Its waters abound with excellent fish. Length, about 450 miles.

Saint Francis Xavier College, located in New York. It was founded in 1847 by the Jesuits, and was granted the powers of a university in 1861 by the State board of regents. Its organization includes a collegiate and a preparatory department. The regular college course leads to the degree of A.B.; it includes instruction in logic, metaphysics, and theodicy, English and the classics, mathematics and science, and history. Post-graduate work in literature, history, sociology and psychology is provided for, and leads to the degree of A.M. There are 46 scholarships. The college is well equipped; the library in 1910 contained 115,000 volumes, and the grounds and buildings were valued at over \$750,000. The students in 1910 numbered 454, a large majority being in the preparatory department, and the faculty 38.

Saint Gall, gǎl, Switzerland, (1) capital of the Canton of Saint Gall, on the Steinach, in a high, narrow valley, about 50 miles from Zürich. It is the see of a bishop, and has besides the cathedral, several churches, a monastery, now containing public offices, a large town-house, library, and orphan asylum. The town library is rich in works relating to the Reformation. The ancient Benedictine Abbey was famous as an asylum of learning during the Dark Ages, and was one of the most celebrated educational institutions of Europe. Several of the classics, namely, Quintilian, Silicus, Italicus, and Ammianus Marcellinus, were solely preserved among its MSS. Notker and Ekkehard were among its pupils. Saint Gall is an important manufacturing centre, celebrated for its fine laces and embroideries.

(2) The Canton covers an area of about 780

SAINT GAUDENS.—SAINT GERMAIN-EN-LAYE

square miles. It has a diversified surface; the southern and central portions are covered by lofty Alpine ranges. Its principal lake is the Wallenstadersee. The climate of the valley is mild, but in the mountainous district is rigorous. There are important stone quarries, much wood and good pastures; on the lower slopes vineyards and orchards, and some arable lands. Manufactures consist of cotton and linen goods. The constitution is preeminently democratic. German is the language spoken. Pop. about 255,000.

Saint Gaudens, gä'denz, Augustus, American sculptor: b. Dublin, Ireland, 1 March 1848; d. Cornish, N. H., 3 Aug. 1907. He was brought to the United States in infancy and at 13 was bound in apprenticeship to learn cameo-cutting and spent several years at this art. Six years later (1867) he went to Paris and studied under the sculptor Joffroy at the Ecole des Beaux Arts. While at Rome in 1871 he produced his first figure, 'Hiawatha,' and the following year returned to the United States. The Sherman equestrian statue which was unveiled at the southeast entrance of Central Park in 1904 is the last of a series of five in which are commemorated heroes of the Civil War, among the most notable of which is the remarkable statue of Farragut in Madison Square, New York. Saint Gaudens was a sculptor of originality and freshness, who had adopted the best standards of French taste and method of execution without being hidebound by tradition; he had a style at once polished and free. Among his other works are the 'President Lincoln' statue in Lincoln Park, Chicago; the bas-relief 'Adoration of the Cross by Angels'; the 'Shaw Monument' at Boston; and the 'Diana' on the tower of Madison Square Garden, New York. He also took part in executing the 'Parnell Memorial' monument in 1901, designed several medals of presentation authorized by Congress, and assisted John La Farge in decorating Trinity Church, Boston.

What perhaps is the most striking characteristic of all his ideal statues is that of 'The Puritan' (at Springfield, Mass.). This is the puritan of earlier New England in all his aggressive and unbending strength—soldier, theologian, statesman. There is nothing winning or conciliating in his air. He is come to conquer the wilderness as Cromwell conquered the aristocracy of England and wiped out for the brief period of the Commonwealth the haughtiest of European dynasties. The puritan, as Saint Gaudens has portrayed him, carries the Bible next his heart in one hand and a stout cudgel of oak in the other. He personifies those unswerving, and sometimes fanatic principles on which the ancient commonwealths of New England were established. Of the Sherman monument, executed by Gaudens, a critic had said: 'The composition of the Sherman is his own, and it has the spontaneity and the balance of a work evolved straight from a powerful imagination and an original mind. The Victory is exactly where it belongs, and bears a relation as true, as unforced, as anything in nature itself to the horseman pressing close upon its flying robe. Once more a word on the sculptor's discretion is inevitable. He wanted to express movement in this monument, to give to Vic-

tory almost aerial lightness in her carriage, to embody in the horse a type of great strength, pushing its way to the front, and to make Sherman himself the very ideal of a leader, who spurns the miles behind him. The bronze seems almost sentient. The group quivers with vitality. But the rhythm of this dramatic conception is held so well in hand, it is so majestic, that classic art itself could not produce a more nobly monumental effect.'

Saint George and the Dragon. See DRAGON.

Saint George, Cape, Newfoundland, the westernmost projection of the island, forming the northwestern extremity of Saint George Bay, on the Gulf of Saint Lawrence.

Saint George's Channel, an arm of the Atlantic which separates Ireland from England. At the north it unites with the Irish Sea. Its entire length from southwest to northeast is about 210 miles. The tide rises in this channel about the same time as in the English Channel, so that there is high water simultaneously at Brest in France, Falmouth in England, and Cape Clear in Ireland.

Saint George's Chapel, Windsor, England. See WINDSOR CASTLE.

Saint Germain, sǎn-zhër-mǎn, COUNT OF, adventurer of the 18th century: b. perhaps 1710; d. Eckernförde, Schleswig, 1784. A mystery enveloped his birth and origin, of which he took every advantage. He spoke English, German, Italian, Spanish, and Portuguese to perfection, and French with a slight Piedmontese accent; and was variously thought to be the son of a tax collector at San Germano, Savoy, an Alsatian Jew, a Portuguese marquis named Betmar, or the illicit offspring of a Spanish princess. After sojourning in various cities of Italy under as many pseudonyms, he lived from 1750 to 1760 at the French court under the patronage of Marshal de Belle-Isle, and, having a fine personal appearance and address, considerable erudition, and a wonderful memory, became a favorite of Mme. de Pompadour and the king. He was reported to be from 2,000 to 3,000 years old. Frederick the Great, having asked Voltaire for some particulars respecting this mysterious person, was told that he was "a man who never dies and who knows every thing." He passed the last years of his life at the court of the prince of Hesse-Cassel, and is supposed to have been employed during the greater part of his life as a spy at the courts at which he resided. Cagliostro owned himself a pupil of the Count of Saint Germain. Consult: Oettinger, 'Graf Saint Germain' (1846).

Saint Germain-en-Laye, ǎn lâ, France, a town in the department of Seine-et-Oise, on a height bordering the Seine, nine miles west of Paris. At the edge of a forest, 200 feet above the river, the air is bracing and salubrious. It is a favorite summer resort and residence of Parisians. The terrace of Saint Germain is one of the finest promenades in Europe and commands an extensive view of the valley of the Seine and surrounding hills. The ancient castle of the town now serves as a museum of antiquities; it was destroyed and restored at various epochs. In the Henry IV. pavilion Thiers died (1877). The old castle was first built by Charles V.



THE PURITAN, by *Saint-Gaudens*

(1370), and reconstructed and embellished by many succeeding sovereigns, especially Louis XIV. Here were born Charles IX., Margaret of Navarre, Henry II., and Louis XIV. James II. of England and most of his family here lived and died as exiles. It now serves as barracks and a military prison. Saint Germain is the seat of one of the cavalry garrisons which surround Paris; at a short distance is the Convent des Loges, connected with the Legion of Honor (Saint Denis).

Saint Germain de Rimouski. See RIMOUSKI.

Saint Gotthard, göth'ard, Switzerland, a mountain group on the confines of the cantons Uri, Grisons, Ticino, and Valais, belonging to the Lepontine or Helvetic Alps, which it connects with the Bernese Alps. It forms a kind of central nucleus in the great watershed of Europe; each of its slopes giving rise to an important river—the north to the Reuss, the south to the Ticino, the west to the Rhône, and the east to the Rhine; all these rivers rise within a circuit of 10 miles from its centre. The culminating point has a height of 10,600 feet, and three other summits are beyond the limit of perpetual snow. The Col of Saint Gotthard, at its summit level, where the Hospice stands, is 6,808 feet high. A bridle path over the pass had existed since the 6th century and over it an excellent carriage road was completed in 1832, in which, particularly on the Italian side, formidable difficulties were surmounted, and much engineering skill displayed. A railway tunnel pierces this mountain group between Göschenen on the north and Airolo on the south, thus directly connecting the railway system of North Italy with those of Switzerland and Western and Central Germany. This tunnel is the longest in the world, being 16,295 yards, or rather more than 9¼ miles long. Its construction, begun in 1872, was completed in 1881, and it was opened for traffic early in 1882. Its total cost was about \$45,400,000, defrayed by Swiss, German, and Italian state subventions, by mortgages and shares. The excavation was carried on simultaneously on the Italian and the Swiss side, the workmen finally meeting in the middle, where the height above sea-level is 3,785 feet.

Saint Gregory. See GREGORY, SAINT.

Saint Helena, hē-lē'nā, an island in the Atlantic, belonging to Great Britain, 700 miles southeast of the island of Ascension, the nearest land. The area is about 47 square miles. Although isolated as relates to its contiguity to the mainland, it is in the direct line of ocean communication via the Cape of Good Hope, many vessels making it a halting station. It is an extinct volcano whose crater forms the main ridge. Many gorges, some of which are 1,000 feet deep, converge from the walls of the crater in all directions and numerous caves have been formed. High cliffs extend all around its shores to the water's edge, and there is a good harbor.

The fauna and flora are deeply interesting, many specimens being peculiar to the island. Farm and garden produce constitute the entire wealth of the colony; Jamestown (3,000 inhabitants) is the only town. Longwood, where Napoleon died, is a farm-house, standing on a high plain. The Portuguese discovered the is-

land, subsequently the Dutch took possession, and later it was ceded to Great Britain. Its chief interest consists in its being the scene of Napoleon's captivity.

Saint Hel'ens, England, Lancashire, 11 miles northeast of Liverpool, a municipal county and parliamentary borough, and market town. A town hall (1875-6), a technical institute (1896), churches, schools, library and baths, an asylum and hospitals, besides numerous parks and recreation grounds are the main modern features. The town owes its importance to the coal-beds in the environs, and to its glass-works, copper-smelting, the manufacture of iron and steel, chemical and lead works, potteries, breweries and other industries.

Saint Helens, a volcanic peak of the Cascade Range, in the State of Washington; lat. 46° 12' N., lon. 122° 4' W. The volcanic débris at the base and beyond is of ancient origin; the mountain has all the appearance of an extinct volcano. Height, 9,750 feet. It resembles Mount Rainier in its treeless sides and ice-covered summit, but it is smaller. On the north side, at the base, is Spirit Lake.

Saint Helier, hēl'yèr, Channel Islands, capital of the Island of Jersey, and a favorite European summer resort, on the east side of Saint Aubin's Bay, on the south coast. It is strongly fortified and defended by Elizabeth Castle (1551-86), on a rocky island connected with the mainland by a causeway, and by Fort Regent, an imposing citadel dominating the town. The principal buildings are Victoria College; the Maison Saint Louis or Jesuit College; the court-house; public library, town hall, hospital, Norman parish church, and the French Roman Catholic cathedral. Fine markets, an esplanade and marine drive four miles long encircling the bay, and extensive and well built harbors, are prominent features. There is considerable trade with England, France, and India, in fruit, potatoes, and cattle. Pop. 29,100.

Saint Henri, or **Tannery West**, Canada, an incorporated city of Hochelaga County, Quebec, suburban to Montreal on the southwest. It is a busy industrial centre on the Lachine Canal, and has a station on the Grand Trunk Railway. Cotton, leather, confectionery, sewing machines, and machinery are among its principal manufactures.

Saint Hilaire, sã-tē-lâr, **Auguste François César**, called **Auguste Prouvençal de**, French naturalist and traveler: b. Orléans 4 Oct. 1779; d. there 30 Sept. 1853. A botanical expert, he set out in 1816 on a long journey through Brazil, carrying his explorations to regions then unknown, and returning in 1822 with valuable collections. In 1830 he was admitted to the Paris Academy of Sciences; subsequently he was made professor of botany in the faculty of sciences at Paris. He made several discoveries of scientific value, and published three narratives of travel, 'Voyage dans la Province de Rio de Janeiro et Minas Gerães' (1830); 'Voyage dans le District des Diamants et sur le Littoral du Brésil' (1833); 'Voyage aux Sources de San Francisco et dans la Province de Goyaz' (1847-8); besides 'Flora Brasiliæ Meridionalis' (with Jussieu and Cambessèdes 1825), and 'Leçons de Botanique' (1840-1).

Saint-Hilaire, Marco de, pseudonym of **Émile Marc Hilaire**, French writer: b. Versailles about 1796; d. 5 Dec. 1887. He was educated as a page at the court of Napoleon I., and finding himself without means of support after the Restoration, turned his attention to literature. Though not important as a writer, his continued glorification of Napoleon was popular and undoubtedly did much to pave the way for the Second Empire. His work includes: 'Mémoires d'un Page de la Cour impériale' (1830); 'Souvenirs de la Vie privée de Napoléon' (1838); 'Souvenirs intimes du Temps de l'Empire' (6 vols., 1838-46); 'Histoire de Napoléon III.' (1853); etc.

Saint Hubert, Order of, a Bavarian order founded by Gerhardt V. in 1444, and which was originally named the Order of the Horn, so called from the hunting horns of which the links of chain were made. The membership was composed of the nobility, the number being unrestricted, while the number of members of lower rank was limited to 12. A white cross with eight points, on each of which is a small golden ball, constitutes the decoration. A crown surmounts the cross, while the arms of the cross are divided by three rays of gold representing Light from Heaven. On the medallion is pictured Saint Hubert's conversion, under which, on a red ribbon, is the inscription "*In trav vast*" (Firm in Faith).

Saint Hyacinthe, hī'a-sinth (Fr. *Saint é-à-saint*), Canada, city and port of entry, county-seat of Saint Hyacinthe County, Quebec; on the Yamaska and Black rivers, and on the Grand Trunk, Canadian Pacific, Intercolonial, and Quebec Southern railways; 35 miles northeast of Montreal. It is the seat of a Roman Catholic bishop, and among its more notable institutions are Saint Hyacinthe College (Jesuit), occupying a handsome stone building, a nunnery with a seminary for young ladies, a hospital in charge of the Sisters of Charity, and monasteries of the Precious Blood and Dominican Fathers. The principal manufactures of the city are woollen goods, lace, linens, hosiery, corsets, boots and shoes, leather, flour, lumber, woodenware, organs, agricultural implements, and casting and machinery. Pop. about 10,000.

Saint Ignatius College, a Roman Catholic institution located at Chicago, Ill. It was chartered in 1870, and is under the control of the Jesuits. It has a collegiate or classical, a commercial, and an academic department; religious instruction is a part of all courses. In the collegiate department the degrees of A.B., B.S., and Ph.B. are conferred; and the degrees A.M. and Ph.D. for graduate work. Though the College is designed especially for Roman Catholic students, non-Catholics are admitted. The library contains over 35,000 volumes, including a select library for the special use of undergraduates; there are also a good scientific laboratory equipment and valuable mineralogical and zoological museums. There are no dormitories. The College has no endowment, and is dependent mainly upon its tuition fees for income; the students number about 500, and the faculty about 40.

Saint Ives, ivz, England, seaport and watering resort, in Cornwall on Saint Ives Bay, 57 miles southwest of Plymouth. The parish

church of Saint Andrew is in the Early Perpendicular style of the 15th century. The town-hall, a free library and a new pier, are, besides the harbor, the chief features of interest. Pop. about 7,000.

Saint Jacob, or **Sankt Jakob**, sänkt yä'kōp, Switzerland, a small village on the Birs in the canton of Basel, two miles southeast of Basel. It is noted for the important battle fought there on 26 Aug. 1444, between the Swiss Confederates and the Armagnacs, in which the latter were totally defeated.

Saint James' Coffee-house, a famous Whig coffee-house of London which flourished from the time of Queen Anne until late in the reign of George III. It stood on Saint James' Street in the neighborhood of Saint James' Palace, and was much frequented by Swift and Harley in its early days. It was here that Goldsmith's poem 'Retaliation' originated. The poet, a member of a group of men of talent who met here, was proverbially late in his arrivals. On one such occasion those present wrote in jest epitaphs "on the late Dr. Goldsmith." None is preserved save Garrick's, which became famous:

Here lies poet Goldsmith, for shortness called Noll;
He wrote like an angel, but talked like poor Poll.

The retort above mentioned dealt in a satirical vein with the club members who had exercised their wit upon him.

Saint James' Palace, England, a royal palace in London, between Saint James and Green Parks. It was built originally for a hospital, reconstructed by Henry VIII., enlarged by Charles I., and up to the time of George IV. was the permanent royal residence. It is still known as the Court of Saint James, being occupied by the royal family. Henry VIII. annexed to the palace a park enclosed by a brick wall, connecting it with Whitehall. Queen Mary died here in 1558; Charles I. spent his last night in this palace; and here were born Charles II., the Old Pretender, and George IV. After Whitehall burned down in 1697, Saint James became the London residence of the sovereigns up to the time of Queen Victoria. In 1837 Buckingham Palace became the royal home. The park covers 58 acres.

Saint Jean d'Acre, sän zhōn dāk, Palestine. See **ACRE**.

Saint John, one of the 12 Apostles of Jesus Christ. He and his brother James are often spoken of as sons of Zebedee. It is commonly accepted (cf. Mark xv. 40 and Matt. xxvii. 56) that his mother's name was Salome and it is still further conjectured by many (see John xix. 25) that she was a sister of Mary, the mother of Jesus—a relation which would render more natural the committing by Jesus of his mother to the care of John. The family seems to have possessed some means, as Zebedee employed hired servants in his fishing business, Salome is mentioned among the pious women who aided in the support of Jesus and his associates during his ministry, and John himself was personally known to the high priest.

Of his early life we know nothing. Presumably he had the ordinary training of the Jewish boy of his time, and no more. In the order

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of narration, he first appears, according to an obvious inference, as an unnamed disciple of John the Baptist, who with Andrew follows Jesus (John i. 35-39). After some association with Jesus, John returned to his occupation as a fisherman, from which Jesus summoned him and his brother, together with Simon and Andrew, to discipleship, which was the basis of his appointment as one of the 12 apostles. In this company he was one of the three who were admitted to the closest intimacy with their Master and, indeed, is understood to be "the disciple whom Jesus loved." Little in particular is noted, however, in reference to him while Jesus lived. He and his brother are said to have been called "Boanerges," defined as "Sons of Thunder" (Mark iii. 17). While the meaning is somewhat obscure, it seems most probable that this hints at great stores of emotional power and passion. He, with his brother, is rebuked for proposing to summon fire from heaven to destroy the inhospitable Samaritan village, and he alone confesses attempting to check the activity of a healer who was not of their company. He alone of the apostolic company is mentioned as present at the trial of his Master and at his crucifixion, where he received the commission to care for Mary, the mother of Jesus, which he faithfully carried out, making a home for her till her death.

It appears from the statements in Acts and of Paul in his Epistle to the Galatians that for some time John remained in Jerusalem. Beyond this we are dependent upon tradition, which consistently associated the latest years of his life with the city of Ephesus. To be sure, on the basis of uncertain inferences from an obscure passage possibly incorrectly quoted by Eusebius from Papias, it has been argued that all the tradition that John was at Ephesus was due to the confusion of the Apostle with a supposed presbyter and original disciple of Jesus bearing the same name. But all the positive evidence tends toward the association of John in his latest years with Ephesus. There is a fragmentary tradition that he went to Rome and was there plunged into a cauldron of boiling oil, from which he miraculously escaped unharmed, and that he was then banished to an island. John, the author of the Apocalypse, speaks of himself as being "in the isle that is called Patmos," and the date which is given by Irenæus and others for the exile of John the apostle is late in the reign of Domitian, and for his return the year 96, early in the reign of Nerva. There is no tradition as to the date of his death. Many legends are current as to his life at Ephesus. Irenæus tells of his hostility to the tenets of the Gnostic Cerinthus, such that John even refused to remain under the same roof with the heretic. Clement of Alexandria exalts his pastoral fidelity by a story how he journeyed into the forest to reclaim a young man who had fallen into evil ways and joined a band of robbers. Cassian relates that when he was censured for spending time in play with a tame partridge, he answered that the bow cannot always be bent. The story, however, which is most familiar, is due to Jerome, who tells that, when so aged that he must be carried into

church and was unable to speak at any length, John would continually repeat, "Little children, love one another." Perhaps partly based on this story, partly perhaps on an impression gained from a superficial reading of his letters, the notion has widely prevailed that John was a weak sentimentalist. But this is unjust. It has been profoundly said of his epistles that their words are thunderpeals, and it is plain that in his soul burned the fires of passion and power which made him in his youth one of the "Sons of Thunder," although in his age he had learned repression and self-mastery.

DAVID FOSTER ESTES,

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Saint John, Charles Edward, American physicist: b. Allen, Mich., 15 March 1857. He was graduated at the Michigan Normal College in 1876, and studied physics at Harvard and at the University of Berlin. He became instructor of physics at Michigan Normal College in 1885; was made associate professor at Oberlin College in 1897, and in 1899 became professor of physics and astronomy at that institution. He has written 'Wave-Lengths of Electricity on Iron Wires' (1894); 'A Study of Silphium Perfoliatum and Dipsacus Laciniatus in Regard to Insects' (1887).

Saint John, Frederick Edward Molyneux, Canadian journalist and author: b. Newcastle, England, 28 Nov. 1838. His father was one of Wellington's veterans at the battle of Waterloo, and the son followed him in a military career, on 23 April 1855 entering the Royal Marines (Light Infantry) as second lieutenant. He served under General Van Straubenzie throughout the operations against Canton in 1857-8, and acted with such gallantry under fire during the storming of the fort that in August 1858 he was promoted first lieutenant. In 1868 he came to Canada and being a member of the staff of the Toronto 'Globe' was appointed in 1870 to accompany Col. Wolseley's Red River expedition, and later served with Lord Dufferin on his tour of British Columbia. Upon the forming of the Northwest Territories, he became the first clerk of the Legislature, the first secretary of the Protestant Board of Education and later was appointed sheriff and Indian commissioner. In 1879 he returned to England, where in 1884 he became the first emigration agent and London secretary to the Canadian Pacific Railway. He was at different times editor of the Winnipeg *Standard*, the Montreal *Herald*, and the Manitoba *Free Press*, and in 1888 was president of the Ottawa Press Gallery. He has published: 'A Sea of Mountains,' an account of Lord Dufferin's tour (1877); and 'Under the Mistletoe,' a society play.

Saint John, Henry. See BOLINGBROKE, VIS-COUNT.

Saint John, James Augustus, English author and traveler: b. Carmarthenshire, Wales, 24 Sept. 1801; d. London 22 Sept. 1875. At 16 he went to London and engaged in newspaper work, and in 1827 started the 'Weekly Review.' He lived much of his life abroad, in France, Switzerland, Egypt, and elsewhere, and found material in his travels for many of his works. He contributed to 'Constable's Miscellany' in

SAINT JOHN — SAINT JOHN RIVER

1830 a 'Journal of a Residence in Normandy' and wrote 'Egypt and Mohammed Ali' (1834); 'Anatomy of Society' (1831); 'Manners and Customs of Ancient Greece' (1842); 'Egypt and Nubia' (1845); 'Views in the Eastern Archipelago' (1847); 'Isis, an Egyptian Pilgrimage' (1853); 'Philosophy at the Foot of the Cross' (1854); 'Nemesis of Power' (1854); 'Preaching of Christ' (1856). He also wrote 'Lives of Celebrated Travelers' (1831), a biography of 'Louis Napoleon' (1857), an elaborate 'Life of Sir Walter Raleigh' (1868-9); etc.

Saint John, Sir Spencer, English diplomat, son of J. A. Saint John (q.v.): b. London, 22 Dec. 1825. In 1848 he was appointed secretary to Sir James Brooke in Borneo, in 1850 became secretary to the mission to Siam, and during 1855-61 was consul-general in Borneo. During the years 1861-96 he was consul successively in Haiti, Lima, Bolivia, Mexico, and Stockholm. He was knighted in 1881. He has published 'Life in the Forests of the Far East' (1862); 'Life of Sir James Brooke, Rajah of Sarawak' (1878); 'Hayti, or the Black Republic' (1885); 'Rajah Brooke' (1899).

Saint John, one of the Virgin Islands, Danish West Indies, lying east of Saint Thomas (q.v.); area, 21 square miles. It is of volcanic origin and hilly; only a small portion of the land is cultivated; sugar is the chief agricultural product. Cattle are raised and exported, and bay rum is also exported. Coral Bay, on the east coast, is one of the best sheltered and safest harbors of refuge during hurricanes in the Antilles. The Island was included in the treaty of 1902 for the purchase of the Danish West Indies by the United States, which was rejected by the Danish Folkething. Pop. 925. See WEST INDIES, DANISH.

Saint John, West Indies, the capital of Antigua; situated on the northwest coast, stands at the head of a safe but small bay. The residence of the English governor-in-chief is the principal building. The staple of the island is sugar, which, together with pineapples, forms the chief export trade.

Saint John, Canada, city and county-seat of Saint John County, New Brunswick, situated at the mouth of the Saint John River on the shores of the Bay of Fundy; on the Canadian P., the Intercolonial, and the Shore Line R.R.'s.; 450 miles from Boston, 480 from Montreal and 275 from Halifax. It is the Atlantic terminus of the Canadian Pacific Railway.

Shipping Interests. — The harbor of Saint John can be entered by ships of any size and has ample accommodations for a very large number. It has always been the principal port in New Brunswick for the shipment of lumber, for it naturally commands the trade of the Saint John River and its tributaries, which flow through one of the great forest regions of the continent. The port is becoming the great winter port of Canada and there are now three elevators, and connected with them berths for seven large steamships which can all be loading or discharging at the same time. Other wharves are being built for the growing trade of the port, the exports of which now amount to \$25,000,000 annually and which are likely every year to increase. The development of the West is making Saint John a very important shipping port and the outlet for

a large proportion of the products of the great prairie region beyond Lake Superior. During the year 1903, 2,724 vessels measuring 1,200,200 tons entered or cleared at Saint John in the foreign trade, and 1,236 vessels measuring 687,742 in the coasting trade. Seven lines of steamships run from St. John to Great Britain during the winter. There is also a line of steamships to Bermuda, Barbadoes, Trinidad, and Demarara.

Saint John has a steamboat connection with Portland, Me., Boston, Digby, Yarmouth, Grand Manan and other points on the sea coast, and with Fredericton and other points on the river.

Business Interests. — Saint John has become a considerable manufacturing centre, and has cotton mills, iron and brass foundries, nail factories, rolling mills, a broom and brush factory, flour mills, and many other industries. The saw-mills at Saint John and vicinity employ about 2,000 persons and form its leading industry. Seven chartered banks and three private banks do business in Saint John.

Public Works, Buildings, etc. — Saint John has an electric railway system, electric lights and a splendid water and sewerage system. It has a large public hospital, fine modern school houses, exhibition buildings, free public library, and other public buildings of a similar character. Its custom house is said to be one of the finest in the world. The city has about 40 churches.

History, Population, etc. — The Saint John River received its name from Champlain, who visited it in the year 1604, and it was at that time the site of an Indian town. The French held possession of the country until the year 1713, when Acadia was ceded to Great Britain, under the Treaty of Utrecht. A fort was built in 1630 by Charles LaTour on the west side of the harbour, which was afterwards from time to time occupied by garrisons until the year 1700, when it was allowed to fall into ruin for about half a century, when, about the year 1758, it was taken possession of by the English and named Fort Frederick. The first English settlement at Saint John was in 1762 when Messrs. Simonds, Hazen, and White began business at what is now called Portland Point and engaged in the fisheries and in the manufacture of lime. In 1783, Saint John received a large accession to its population by the coming of the Loyalists, who had left the old Thirteen Colonies which had become independent. Saint John received a charter and became a city in 1785, and now has a population of 50,000.

JAMES HANNAY,
Author of 'New Brunswick: Its Resources and Advantages.'

Saint John, Knights of. See JOHN (SAINT).

Saint John, Lake, Canada, in the Chicoutimi district, Quebec, 200 miles by rail north of Quebec, a circular body of water, about 28 miles long and 25 miles broad, drained by the Saguenay River (q.v.). It receives the waters of the Metabetchouan, the Mistassini, the Peribonca, the Ashuapmouchouan, the Ouitchouan, and several smaller streams.

Saint John River, Canada, the largest river of the province of New Brunswick, has its source in the highlands of northern Maine. After a course of 446 miles, it empties into the Bay of Fundy through a rocky gorge about 600 feet wide.



1. Parliament House, St. John's, N. F.
2. The Governor's Residence.

SAINT JOHNS

It enters the harbor through a rocky and sharply defined gorge, having a total fall of about 17 feet. Throughout most of its upper course it forms the boundary between Maine and Canada. Near the sea it is navigable for large steamers and for 75 or 80 miles for smaller craft.

Saint Johns, Mich., village, county-seat of Clinton County; on the Detroit, Grand Haven & Milwaukee railroad; about 20 miles north of Lansing and 100 miles west-northwest of Detroit. It is in an agricultural region and it has considerable manufacturing interests. The chief manufactures are a large table factory, grist mills, lumber mills, carriage work, machine shop, and foundry. There is considerable trade in manufactures and farm products. The three banks have a combined capital of \$185,000. The educational institutions are a high school, public graded school, and a library, which is under the auspices of the Ladies' Library Association. Pop. (1910) 3,154.

Saint John's, Newfoundland, the capital of the colony, situated on the east side of the Island, opposite to the Atlantic, midway between Cape Race and Cape Bonavista, in N. Lat. 47° 33' 54", and W. Long. 52° 40' 18". It is distant 1,691 miles from Cape Clear (Ireland), 1,213 from New York, 885 from Boston, and 488 from Halifax, N. S. The harbor is completely landlocked, with good holding ground, and is entered by a short passage, known as the "Narrows," between high beetling cliffs. The town is situated on the north side of the harbor.

Communication.—Saint John's is the terminus of the Newfoundland Railway, which runs across the Island to Port Aux Basques, from whence the palace steamer "Bruce" connects three times a week with Sidney, C. B. It is expected that the Reid Newfoundland Company will soon convert this into a daily service each way. There is a steamship line to Liverpool, England, carried on throughout the year by the Furness Line; to Glasgow, from April to January, by the Allan Line; to New York, by the Red Cross Line; to Philadelphia and Halifax, N. S., by the Allan, Red Cross, and Furness Lines; to Montreal, Prince Edward Island, and Sydney, C. B., by the Black Diamond Line, and freighting steamers. Constant communication is maintained with all parts of Newfoundland and Labrador by the fine steamers of the Bowring and Reid Lines. Each bay has also a local steamer running in connection with the railway.

Shipping Interests.—Saint John's is not only the capital of the colony but the centre of all the business and financial interests of the Island and Labrador. Three Canadian banks, Bank of Montreal, Bank of Nova Scotia, and Royal Bank, have their headquarters in the city. All the principal merchants reside here, all the supplies for the chief business, the fishery, are bought in Saint John's, and the great bulk of the exports shipped from the capital, 90 per cent. of the duties being paid and the revenue collected in Saint John's; 991 vessels of 720,332 tons entered and cleared during the year 1905.

At the head of Saint John's harbor there is a splendid dry dock, built by the government, but now leased to the Reid Newfoundland Com-

pany. It is capable of taking up the largest ships. There is ample warehouse room and the Reid repairing shops are equipped with all the best modern machinery.

Manufactures.—There are several important factories, one of the largest being a rope walk, also biscuit factories, oleomargarine factories, tanneries, breweries, lumber factories, foundries, a large tobacco factory, and an extensive boot and shoe factory, with several minor establishments. The most extensive business is connected with the curing and drying of codfish for foreign markets, about \$8,000,000 worth of fishery products being shipped every year. Seal, cod, and whale oil are manufactured and guano from the whale refuse. Between 300,000 and 400,000 skins of the hair seal are sold to be manufactured into leather and fur abroad.

Public Works, Buildings, Etc.—The Capital of Newfoundland has an electric railway, electric light, and owing to recent improvements one of the finest water services of any town in America. There are very complete telephone and telegraph lines, one belonging to the Anglo-American Telegraph Company, the other to the local government. The town possesses a large public hospital, convalescent home, lunatic asylum, poorhouse, a large Roman Catholic Cathedral, and an Anglican Cathedral, one of the most beautiful of churches, a masterpiece of the late Gilbert Scott, which has lately been restored after being destroyed by fire in 1892. The Customs-house and Courthouse are commodious, but not picturesque. Government House has fine grounds, but the building is very plain. There is no Public Library in the Capital, the town having refused a most liberal offer from Mr. Carnegie.

Education.—The education is strictly denominational, even the Salvation Army having separate schools. The Anglican, Roman Catholic, and Wesleyan bodies have very fine Colleges and good Schools, but no University.

History.—Owing to its unrivalled position in the centre of the great cod-fishing grounds, Saint John's became, from the date of the discovery of North America, in 1497, the centre and metropolis of this great industry. The date of its foundation cannot be exactly determined. Its first inhabitants were part of the fishing ship's crews left behind to build boats, houses, stages, etc., for the fishery. There were 20 houses in Saint John's in 1540. In 1583, Hayes, the survivor of Gilbert's ill-fated expedition, speaks of the town as a "place very populous and much frequented." A large barter trade was carried on between the French, Portuguese, Spanish Basques, and the English fishermen, the principal traffic consisting in selling for cash, or bartering for fish and oil. Mediterranean products, salt, olive oil, fruits, wines, etc., were exchanged for the then as now famous West of England cloth, cordage, cloth caps, and hosiery, and the well-known Sheffield cutlery. There were 20,000 men engaged in this early transatlantic fishery, and the trade was one of the most important of the Tudor age. The American colonists began trading with Newfoundland as early as 1641. By the time of the Revolution, Saint John's did a business of \$4,000,000 with the United States, mainly through Boston and New England.

SAINT JOHNS—SAINT JOHN'S COLLEGE

The town was twice invaded by the French and destroyed by them and their Indian allies. It was recaptured in 1762, by Colonel William Amherst, with the Highlanders and Royal Americans, the last and most gallant fight of the great Seven Years' War. Saint John's was built entirely of wood and has been several times utterly destroyed by fire, once in 1817, again in 1846, and partially in 1892. It has been greatly improved of late years and is now built chiefly of stone and brick and is a well-laid-out city with Roman Catholic and Anglican Cathedrals, numerous other places of worship, Colleges, Schools, Town Hall and Courthouse combined, Parliament House, and other buildings.

Government and Population.—Saint John's is governed by an elected mayor and an elected municipal council of six members. As usual the city debt is large, amounting to \$1,187,222. The total amount of the revenue of the city is \$150,000. The population by the last census (1901) was 29,594, for the city; with the districts of Saint John's East and West, 39,995, divided as follows: Roman Catholic, 21,576; Anglican, 9,556; Wesleyan, 6,737 and other denominations about 2,000.

D. W. PROWSE,

Author of 'The History of Newfoundland, from the Records.'

Saint Johns, Quebec, a town, the county-seat of Saint Johns County, situated on the Richelieu River, 27 miles southeast of Montreal. It is a port of entry and a station on the Grand Trunk, Canadian Pacific, and Central Vermont R.R.'s. The principal manufactures are earthenware and silk goods. Large quantities of lumber and agricultural products from the lower Champlain region are exported through Saint Johns, the exports amounting to nearly \$3,000,000 annually.

Saint Johns, a river in Florida; the source, Lake Poinsett in Orange County, is about 12 miles from the Atlantic Ocean. The river flows north, nearly parallel with the coast, and enters the Atlantic about 15 miles northeast of Jacksonville. The total length is about 350 miles. It flows through swamps, ponds, and lakes; luxuriant vegetation is along its banks the greater part of the course. In some places are large trees, their green foliage intermingled with feathery brown and gray mosses which hang down to the ground. Reptiles are numerous in the marshes. In the north part of its course the land is higher and dryer. It is navigable to Enterprise in Volusia County. See FLORIDA.

Saint John's Bread. See CAROB-TREE.

Saint John's College, an institution located at Toledo, Ohio, under the direction of the Fathers of the Society of Jesus. The college was opened in September 1898, was incorporated on 22 May 1900 and on 29 Aug. 1903 the power to grant degrees, under an amended charter, was ratified by the Secretary of State. The college is divided into academic and collegiate departments. The academic department consists of a four years' course in the study of English composition and literature, Latin and Greek, algebra, history, German, elocution, and the principal business courses. The collegiate course is known as the college course of liberal arts, which, including mathematics, natural

science, a higher course in religion, a study of history from the Catholic viewpoint, and a course in mental philosophy, leads to the degree of B.A. French and Spanish, drawing and typewriting, are also taught. There is also a meteorological observatory connected with the college. In 1904-5 the students numbered 157; the faculty, 15; volumes in the library, over 2,000.

Saint John's College, Cambridge, England, was founded by Margaret, countess of Richmond and Derby, mother of King Henry VII., in 1511, mainly through the exertions of Fisher, bishop of Rochester, then chancellor of the university, who raised sufficient funds to endow 32 fellowships. The college replaced Saint John's Hospital founded in the 12th century, and now consists of a master, at least 56 fellows, 60 foundation scholars, and nine sizars; both fellowships and scholarships being open to all British subjects. Five fellowships are professorial fellowships to be held by professors of the university. There are three divinity studentships of the value of about \$400, tenable for three years, and open to the competition of Bachelors of Arts not of sufficient standing to take the degree of M.A.; also four law studentships of the value of \$450, tenable for four years; and a Hebrew scholarship of the value of \$160, tenable for three years. Some \$33,500 are expended annually in assisting deserving students of the college, and there are a number of prizes which are awarded on the results of the annual examinations. The college has the patronage of 52 church livings. The buildings include four courts chiefly of brick; the new court (1826) across the Cam, built of stone, is united by an ornamental covered bridge, commonly called the "bridge of sighs," with the third court. The chapel (1869) is by Sir Gilbert Scott, and is a fine specimen of the Early Decorated style. The combination-room, 93 feet long, and the library (1623), are curious and striking. Ascham, Ben Jonson, Bentley, Rowland Hill, Wilberforce, Wordsworth, and Lord Palmerston were members of the college.

Saint John's College, Oxford, England, a college founded in 1555 by Sir Thomas White, a London alderman, for a president, 50 fellows and scholars, a chaplain, an organist, six singing men, eight choristers, and two sextons. Some of the buildings belong to the earlier college or Saint Bernard dating from about the middle of the 15th century. With buildings added at subsequent dates the whole form a picturesque group. Under the present statutes the college consists of: (1) Not less than 14 nor more than 18 fellowships, of which seven may be official fellowships, the rest tenable for seven years. To these may at future times be added two *ex-officio* fellowships to be held by the Laudian professor of Arabic and the professor of civil engineering. (2) Not less than 28 scholarships, of which six shall be open, 15 appropriated to Merchant Tailors' School, two to Coventry School, two to Bristol School, two to Reading School, and one to Tunbridge School. (3) Four senior scholarships confined to former pupils of Merchant Tailor's School. There are also the Holmes Scholarship, tenable for five years; the Lambe Scholarship, tenable for four years; the four Casberd scholarships of \$400 each per

SAINT JOHN'S COLLEGE—SAINT JOHN'S WORT

annum, and certain exhibitions for undergraduates not on any foundation, and of at least one year's standing in the college. There are also four fellowships, tenable for 14 years, open with certain limitations and under certain conditions in respect of literary proficiency, first to the kindred of the founder, Dudley Fereday of Ettingshall Park, Stafford, secondly to natives of Staffordshire, and then to any other person whatsoever. Thirty-three church livings are in the patronage of the college.

Saint John's College, located at Annapolis, Md. It was chartered in 1784, and opened to students in 1789, but is the direct successor of King William's School (founded 1696), which in 1784 was merged into the college, thus being one of the oldest institutions of collegiate grade in the United States. The work of the collegiate department is arranged in four courses, classical, Latin-scientific, scientific, and mechanical engineering; in each course certain studies are required and others are elective. The degree of A.B. is conferred for the completion of the classical and Latin-scientific courses; the degree of B.S. for the scientific and mechanical engineering courses. Graduate work is provided for, leading to the degree of A.M., and there is a preparatory school. Instruction in military science and military drill are a part of the curriculum, required of all students. The State provides one full State scholarship for each senatorial district, and in addition 26 scholarships for tuition only, to be distributed among the counties in order of priority of application; there are also other scholarships. In 1904, the grounds and buildings were valued at over \$250,000; Henry Williams Woodward Hall, the new science building, was erected in 1900; the library in 1910 contained 8,200 volumes. The annual income of the year 1910 was \$70,000; the students numbered 190, and the faculty 14.

Saint John's College, an institution in New York, opened 24 July 1841, under the auspices of the Roman Catholic Church. The land upon which the college stands is a part of the old Dutch village of Fordham, and is of historic interest. In 1639 the land between the Harlem and Bronx rivers was purchased by the Dutch West India Company, from three Indian sachems. In 1694 the land which is now the college property came into possession of the Corsa family. The farm was known as "Rose Hill," a name which still clings to the place and by which the college was known in earlier years. In 1787 the "Rose Hill" farm was purchased by John Watts and later it passed through several owners to Horatio Shepherd Moat. In 1838 Moat built the stone house which is now the central college building, and which contains the principal offices and the reception room. In 1839 the new house and a farm of 80 acres was purchased by John Hughes (q.v.), the coadjutor bishop of New York, for \$29,750. John McCloskey (q.v.) was first president, and for the five years the college was in charge of secular priests, four clergymen, who afterward became bishops, three who became archbishops, and one a cardinal, were associated with its government or were members of the faculty. On 10 April 1846 the Act of Incorporation was passed which made the school a university with power to grant all degrees usually granted by a

university. In 1846 and 1860 the Fathers of the Society of Jesus bought the buildings and a portion of the 80-acre tract and took charge of the college. It still (1910) remains one of the Jesuit schools. The area of the college grounds is about 70 acres, bounded east and south by Bronx Park (q.v.). The group of gray stone buildings presents an attractive and imposing appearance; the 1904 addition to the buildings, a hall built on the site of the "Rose Hill Manor House" (1690), cost about \$130,000.

The college includes four departments under the same management; the college department furnishes the usual four-year course leading to the degree of B.A.; the academic furnishes a four-year course and prepares for college; the commercial, and the preparatory departments. There are seven scholarships, which have been endowed by friends of the school who designed to aid worthy students. Social life as well as intellectual is fostered by the various college societies. The number of pupils in attendance, in 1910, was 648. Some of the noted alumni are Archbishop Farley, of New York, Mgr. J. F. Mooney, vicar-general of New York, Bishop Hendricks, of Cebu, Philippine Islands, Morgan J. O'Brien, New York, and John T. McDonough, supreme court justice, Philippine Islands.

Saint John's College, located at Washington, D. C. It is the outgrowth of Saint Matthew's Institute, founded in 1870 by the Brothers of the Christian Schools (Roman Catholic); its name was changed to Saint John's Collegiate Institute in 1880, and to Saint John's College in 1887. The ideal of the college is to give a scientific and business education. There are three departments—collegiate, academic (secondary), and preparatory (elementary). The collegiate department offers two courses, English-science, leading to the degree of B.S., and commercial course, for completion of which a commercial diploma is granted. The English-science course includes instruction in French and German; drawing is taught in all three departments. The grounds and buildings in 1904 were valued at over \$150,000; the library contained 5,000 volumes. The students in 1910 numbered 225, the faculty 14.

Saint John's Eve. See JOHN'S, SAINT, EVE or.

Saint John's River, Quebec, the local name near the town of Saint John, of the Richelieu River (q.v.).

Saint John's University, in Collegeville, Minn., founded in 1857 and chartered the same year. It is a Roman Catholic institution in charge of the Order of Saint Benedict. In 1869 the school was granted power to give degrees; and in 1878 it was further empowered by *La XIII.* to grant the degrees of doctors in theology, philosophy, and canon law. In 1883 it received from the legislature of Minnesota the title of university. In 1910 there were connected with the school 36 professors and instructors, and 375 students. The courses lead to the degrees of A.B. and B.S. The preparatory department prepares for the university. There is connected with the school a business department.

Saint John's-wort, a large genus (*Hypericum*) of plants of the family *Hypericaceae*. They

SAINT JOHNSBURY — SAINT JOSEPH

are to be found nearly everywhere in the temperate and torrid zones, and are often shrubs or small trees. The foliage is pellucid punctate or black-dotted, and the leaves and blossoms emit, when bruised, a strong, resinous-aromatic odor, and have a bitter taste, due to an oil possessing astringent and tonic properties, and which held a prominent place in old pharmacopœias. The flowers are perfect and five-merous, borne solitary or in cymose panicles, and are generally yellow. *Hypericum perforatum*, to which formerly the name of Saint John's-wort was limited, has its leaves marked with pellucid dots, somewhat simulating perforations. It is a European plant which has become naturalized in our country, and is a troublesome weed. It is a very smooth, shining herb, sometimes two feet high, with opposite oblong leaves, and bright-yellow flowers in broad terminal cymes. Both petals and leaves are black-dotted. Its yellow, acrid resinous juice will stain the skin purple, and was believed by Dr. Torrey to cause inflammatory trouble in cattle. The dried plant dyed wool yellow.

Tradition states that the Saint John's-wort was so called because blood-like spots appeared on its foliage immediately after the Saint was beheaded, and re-appeared on the anniversary of the date. It was regarded as a universal panacea, and perhaps possessed some curative qualities, especially in external use. It was supposed to preserve persons and property against lightning, but was still more in demand as a preventive of witch-visits, or those of other evil spirits, perhaps because, according to tradition, a baptized person anointing the eyes with the green juice of its inner bark could see witches. Italians gave it the name of "devil-chaser." It was not only worn as an amulet, but was hung over doors and windows; yet it was not safe to tread on it after dark, since the luckless wight that bruised it might be snatched up on a fairy horse and carried about all night; Saint John's-wort, plucked on midsummer night's eve took its place among the love-charms.

Saint Johnsbury, Vt., town, county-seat of Caledonia County; on the Passumpsic River, and on the Boston & M. and the Saint Johnsbury & L. C. R.R.'s; about 34 miles east-northeast of Montpelier. It was settled in 1786 by Jonathan Arnold; and incorporated in 1884. It is in an agricultural region in which there is considerable attention given to dairying; but the principal industry is the manufacturing of the Fairbanks scales. There are about 1,000 men employed in the Fairbanks Scales Works, and an equal number in the combined smaller manufacturing. There are nine churches and one hospital. The educational institutions are the Saint Johnsbury Academy, Notre Dame Academy, public and parish schools, Saint Johnsbury Athenæum and a free library, and the Fairbanks Museum of Natural History. The four banks have a combined capital and deposits of \$2,000,000. The government is vested in a board of trustees. Pop. (1910) 8,098.

CHARLES A. WALTER,
Editor 'Saint Johnsbury Republican.'

Saint Joseph, Mich., city, county-seat of Berrien County; on Lake Michigan, at the mouth of the Saint Joseph River, and on the

Cleveland, C. C. & St. L., the Père Marquette, and the Saint Joseph, S. B. & S. R.R.'s; about two miles south of Benton Harbor and 23 miles north by west of Niles. It has steamer connection with the Lake Michigan ports. It is in an agricultural region, noted especially for its peaches and other fruit. The chief industrial establishments are flour and grist mills, lumber mills, fruit-basket and box factories, machine shops, lumber mills. In the government census of 1900 there are given 75 manufacturing establishments, with 933 employees. The annual value of the products was \$1,308,277. There is an extensive trade in peaches, apples, and lumber. The two state banks have a combined capital of \$50,000. The educational institutions are a high school, public elementary schools, and a public library. Pop. (1910) 5,936.

Saint Joseph, Mo., city and county-seat of Buchanan County, the third city in size and wealth in Missouri, and located on its western border on the east bank of the Missouri River, 131 miles southeast of Omaha.

History.—In 1826, Joseph Robidoux, born in Saint Louis of French parentage, established a trading post at this point known as the "Black-snake Hills," and thus became the founder of the city, which he later christened with his own name. For hundreds of miles on every side, the whole country was then an unbroken wilderness, inhabited only by the aborigines, who gained a scanty subsistence by trapping and hunting. The furs and pelts of the wild animals they killed soon became a source of extensive traffic between the trader and his Indian neighbors. The famous "Platte Purchase" was accomplished through a treaty with the Indians, dated 17 Sept. 1836. The trading post grew into a town, incorporated in 1845, and then into a city, incorporated in 1851. Its growth at first was not rapid, but steady and gradual. Planted, however, in the midst of one of the finest and wealthiest agricultural sections of the United States, and drawing to itself the larger part of the trade that came from the country to the westward, it later on began to assume a more vigorous and rapid growth. In 1880 it had a population of 32,431; (1890) 52,324; (1900) 102,979; and (1910) 77,403.

Trade.—The development and extension of the business and material resources of the city kept pace with its increase in population. As a distributing point for the entire West, from the Mississippi River to the Pacific Ocean, it has but few rivals, and, outside of Saint Louis and San Francisco, no superiors. It has about 50 large wholesale establishments engaged in all branches of trade, with over 1,200 traveling men in the field, selling goods to the retail merchants in almost every town and hamlet throughout this vast region of country lying to the westward. The volume of the jobbing business of the city for the year 1910 exceeded \$75,000,000, and the manufacturing output was over \$40,000,000. This is exclusive of the retail trade, which has been correspondingly large.

Schools, Churches and Charities.—The school census, taken pursuant to the requirement of State law, shows that the children of school age, from 6 to 20 years, number about 40,000. A large portion (12,553) are in actual attendance upon the public schools, housed in 43 public school buildings and taught by 330

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teachers. The most imposing of the school houses now in use is the High School building, erected in 1894-5 on a commanding hill overlooking the city, and involving an expenditure of \$113,534. From it and its humble predecessor 1,107 graduates have been sent forth, since the establishment of a high school course in 1868. All the public school buildings, with the grounds on which they are situated, are valued at \$898,412. The attendance upon the private schools is likewise large, and the buildings used for that purpose correspondingly valuable. In the city are 66 church buildings, owned and used by the different denominations as follows: Baptist, 11; Christian, 4; Jewish, 2; Congregational, 2; Episcopal, 4; Lutheran, 3; Evangelical, 2; Methodist Episcopal, 11; Methodist Episcopal South, 7; Presbyterian, 8; Catholic, 8; Reformed, 1; Unitarian, 1; Christian Science, 1; Latter Day Saints, 1. The aggregate value of this church property is in excess of \$1,000,000. The Young Men's Christian Association building was erected in 1886-7 at a cost of \$60,000, and four years later the Young Women's Christian Association took possession of its handsome home on 10th Street. The Memorial Home for the support and care of helpless and needy old people, and the Home for Little Wanderers, for the sheltering and rearing of poor and neglected children, built and endowed by charitably disposed citizens at an outlay of nearly \$100,000, are substantial structures, worthy of their founders and supporters. The most important charitable institution, however, in Buchanan County, is Hospital No. 2, for the care of the insane, located just east of the city limits, erected and sustained by the State. The original building, which was erected in 1873 at a cost of \$200,000, burned down in 1879, but was at once rebuilt, and has since been added to and improved at a total cost of about \$500,000. The institution, which is a very capacious and imposing structure, has a capacity of 1,350 patients, and requires the services of 205 employees. It is modern in all its appointments, and its management has always been a model of excellence.

Public Buildings.—The court-house, built anew in 1873-5 at a cost of \$173,000, injured by fire and rebuilt in 1885, is in the shape of a Maltese cross, and is a very imposing and capacious structure. Here two divisions of the circuit court, a criminal court, a county court, a probate court and several inferior courts are in continuous session most of the year. Here also are located the offices of the county officials. The United States circuit and district courts are held in the Federal building, finished in 1890, involving in its erection an expenditure of \$345,000. In this building are also located the post-office, the United States internal revenue office and the surveyor of customs and his assistants. Even thus early after its completion the building has been found to be wholly inadequate to meet the demands of the public service; and Congress in 1903 appropriated \$225,000 for the purpose of enlarging it to more than double its present size and capacity. There are now in the post-office proper 80 employees, whose yearly salaries aggregate about \$96,000. The receipts of the post-office for a single fiscal year aggregated approximately \$200,000. The receipts at the South Saint Joseph post-office, located in the stock yards

district, amounted to \$19,240 for the same period. A city-hall and market house was erected in 1873 at a cost of \$50,000, which serves the purpose of a market place on the ground floor, and of offices for the numerous city officials in the upper stories. The city is the owner of two public library buildings, one erected in 1902 in the southern part of the city, at a cost of \$25,000—the other erected in 1900 in the central part, at a cost of \$106,534. Though in their infancy, there are 27,500 volumes on the shelves of these libraries, accessible to the free use of the reading public. Saint Joseph has two large opera houses of modern construction and equipment, with a seating capacity of 1,785 and 1,740, respectively, beside a large number of smaller places of amusement. The Commercial Club, assisted by the Board of Trade, looks after the commercial interests of the city. Both organizations occupy the Chamber of Commerce, built in 1884-5 at a cost of \$105,000. Almost \$100,000 have been already subscribed toward the building of a Convention Hall. This subscription is expected to be largely increased in the course of the next few months, when the work of building will be commenced. The city has 50.68 miles of paved streets, 59.33 miles of main and district sewers, a number of hotels and hospitals, one convent, two elevators, several flouring mills, many factories and five parks, all except one being small in size, but all in an excellent state of improvement. There are 21 newspapers published in Saint Joseph, 5 daily, 9 weekly and 7 monthly.

Light and Water Plants.—The city owns an electric light plant, representing in its construction an expenditure of over \$100,000, and which will be enlarged in the near future to twice its present capacity, in order to meet the demands for additional street lighting, resultant from the recent growth of the municipality. In 1902 there was consumed in the city 180,000,000 feet of gas, at a cost to the consumer of \$1.00 per thousand cubic feet. The gas plant, which was built in 1876 and has been in almost continuous extension and improvement since that time, now represents an investment of about \$1,000,000 of money expended in construction. It has in use 56 miles of main pipe and has a capacity of furnishing 2,000,000 cubic feet of gas every 24 hours. Saint Joseph is supplied with water through an extensive system of waterworks, first built in 1879, and improved and extended since that time, until it now represents in cost of construction an expenditure of over \$1,800,000. The water is pumped from the Missouri River, at a point about three miles above the city, into reservoirs and settling basins, located on a hill 317 feet above the level of the river, and is clarified and purified by means of these basins and the Jewell system of filtration. It is then emptied into water mains, which now aggregate 92 miles in length, and is carried by the force of gravitation to the fire hydrants, 794 in number, and to the myriad points of distribution for the consumers throughout the city.

Railroads.—Saint Joseph has 38 miles of electric street railway, with an extensive electric plant connected therewith, to furnish the motive power for its operation. The equipment of cars, both in number and perfection of construction, is such as to satisfy the demands of street railway travel. By a systematic course of super-

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vision and improvement the whole system has been kept at all times in splendid condition. In 1902 there was a change of ownership in the street railway plant, the purchasers paying therefor as an investment the sum of \$4,000,000. The city is connected with the outside world by nine railroads, including one the construction of which began in 1903. Three lines run to Chicago, three to Kansas City, two to Saint Louis, two to Omaha, one to a connection with the Union Pacific railroad at Grand Island, Neb., and two others traverse that vast territory lying to the west and southwest. Most of them use the Union Station, erected in 1896 at a cost of \$126,000. During the year ending 1 Sept. 1903 there were 438,800 pieces of baggage handled at this station. Two of the railroads centring in the city cross the railroad, wagon and foot bridge, which spans the Missouri River at this point, built by the city in 1872 at a cost of \$716,000. This bridge is about to be enlarged by the two railroad companies using it, so that it will be greatly strengthened and its capacity doubled.

Stock Yards.—A great impetus was given to the growth and prosperity of the city by the improvements and extensions made at the stock yards located at this point, which were begun in the year 1897, and which have been carried on extensively ever since. The stock yards proper consist of 500 acres of land, 80 acres of which are covered by the pens and sheds. There are 20 miles of railroad tracks upon the grounds, and five packing houses engaged in the slaughtering of animals, three of them, Swift & Company, Nelson, Morris & Company, and the Hammond Packing Company have erected large and extensive plants here at a cost of several millions of dollars. A part of the Hammond Packing Company's plant was burned 5 July 1903, but is now being rebuilt on a much more extended plan than before. During the 12 months, ending 1 Sept. 1903, there were slaughtered by these houses 645,694 cattle, 1,681,784 hogs and 637,033 sheep, a large increase, except in the killing of hogs, over the business of the preceding year. During the same period there were 21,407 horses and mules bought and sold, and 51,642 cars of stock handled at the stock yards. There is also a packing house at this point located outside of the stock yards, which does a large business, not included in the foregoing statement.

Financial.—There are nine incorporated banks doing business in Saint Joseph, three national and the other six organized under the banking laws of the State. The Comptroller of the Currency at Washington and the Secretary of State at Jefferson City called for statements from these banks, showing the conditions of their business on 9 Sept. 1903. All responded, making their statements under oath, from which it appears that the entire resources of all the banks in the city, at the close of business on that day, was \$19,478,855.19, and that they had on deposit \$17,371,533.20. The clearings of all the banks belonging to the clearing-house for the 12 months ending 30 Sept. 1909 aggregated \$293,407,800. The city had a public debt (1910), less sinking fund in the treasury applicable to its payment, of \$1,292,250. This outstanding indebtedness is in bonds, bearing 3½ and 4 per cent interest in about equal proportions for each rate. There is no floating debt, the city charter

prohibiting the contracting of any debt, without there being money in the treasury with which to pay it. The assessed valuation of property in the city, made upon a basis of about 40 per cent of its actual value, is \$37,743,450.

Government.—Saint Joseph is governed by a mayor, elected for two years, who is the chief executive officer of the city, and by a common council, entrusted with the enactment of all municipal legislation, whose members are elected for four years, one member from each ward of the city, but chosen by the voters of the whole city, the terms of one half expiring every two years. The city has also a board of public works, charged with originating and recommending to the council all ordinances for the improvement of the streets and other public works, and superintending the construction thereof. This board is appointed by the mayor, comptroller and auditor, not more than two members of which can belong to the same political party. There is also a board of park commissioners, to which is committed the custody, improvement and management of the parks, and a board of police commissioners, appointed by the governor, which has charge of the selection and control of the police force and the enforcement of the police regulations. The public schools are controlled by a school board consisting of six members, one half chosen from each of the two leading political parties, so as to free the management of the schools as much as possible from partisan bias. They serve without pay, and their terms of office are so arranged that two of them expire every two years. The fire department, under the control of the mayor and council, consists of a chief, his assistant and 70 firemen, located in 12 firehouses, distributed throughout the city, and equipped with all the engines, hose, ladders and other appliances needed for extinguishing fire.

Bibliography.—Barns, 'The Commonwealth of Missouri' (1877); 'Encyclopedia of the History of Missouri' (1901); 'History of Buchanan County, Missouri' (1881); 'Buchanan County and Saint Joseph' (1898); 'Saint Joseph Directory' (1903).

B. R. VINEYARD,
Saint Joseph, Mo.

Saint Joseph, an island belonging to the province of Ontario in Canada. It is at the mouth of Saint Mary's River, and near the mainland of both Michigan and Ontario. There are many high bluffs and large rocks on the coast, but nearby the whole of the surface is covered with trees, shrubs, and flowers.

Saint Joseph, (1) A river in Michigan whose source is in Hillsdale County. It flows west-northwest, then south into Indiana, west, then northwest, returning to Michigan and entering Lake Michigan at Saint Joseph (q.v.). South Bend, Ind., is on the banks of this river, at the head of navigation. Its total length is about 250 miles. (2) Another river of the same name rises in the southwestern part of Michigan, crosses the northwestern corner of Ohio, enters Indiana, and flows southwest and unites with Saint Mary's River at Fort Wayne, to form the Maumee (q.v.). Its total length is about 100 miles.

Saint Joseph's Seminary, a theological school at Yonkers, N. Y. The local name for the place is Dunwoodie. The seminary belongs

SAINT-JUST—SAINT LAWRENCE RIVER AND GULF

to the archdiocese of New York, but the attendance is not limited to any locality. The history of the school begins as far back as 1833, when Bishop Dubois began at Nyack, N. Y., the erection of a school on the plan of Mount Saint Mary's (q.v.), Emmitsburg, Md. The corner stone was laid 29 May 1833, but the institution was destroyed by fire before it was finished. Later the project of establishing the school in Brooklyn was proposed, but soon abandoned. The next location, selected by Bishop Hughes, was Lafargeville, Jefferson County, N. Y. A school was opened here, 20 Sept. 1838; but it was soon abandoned, as it was too far from New York. The Lafargeville school was intended for both theological and secular studies. The school was removed to Fordham, N. Y., in 1840 and is now known as Saint John's College (q.v.). The theological department was moved, October 1864, to a new home, and Saint Joseph's Seminary, Troy, N. Y., was opened in charge of professors from the University of Louvain, Belgium. The present seminary at Yonkers is on a beautiful tract of land, and built on the eminence known in history as Valentine Hill. The land was purchased in 1890 by Archbishop Corrigan (q.v.), and the new seminary was dedicated 12 Aug. 1896, and placed in charge of the Sulpician Fathers. In May 1898, one of the gifts presented to Archbishop Corrigan in honor of his silver jubilee was the certificate of the entire liquidation of the debt upon the seminary. The seminary chapel was built entirely at the personal expense of Archbishop Corrigan.

The conditions for admission are (1) a well-formed desire to study for the priesthood, (2) entrance examination, (3) must have completed a good classical course, (4) the permission of the bishop of the diocese to which the applicant belongs. The courses of study demand a large amount of work: as, the course in Sacred Scripture is for five and one half years, and the regular class work is supplemented by an academy or seminary composed of interested students who meet once a week to discuss particular questions. In connection with this department there are two courses of Hebrew, and instructions are given in other Semitic languages. All the other courses are equally thorough. In addition the students regularly visit hospitals, penal and charitable institutions, and teach in Sunday schools. In 1910 there were connected with the seminary 13 professors and instructors and 161 students. The library, in the centre of the main building, contains about 30,000 bound volumes.

Saint-Just, *sǎn zhǔst*, **Antoine Louis de**, French patriot: b. Decize (Nièvre) 25 Aug. 1767; d. Paris 28 July 1794. He studied law at Rheims, but devoted himself almost exclusively to literary pursuits until the outbreak of the Revolution, when he became one of its most notable participants. His political career as deputy from Aisne to the convention at Paris in 1792 began with his famous oration setting forth his reasons for voting for the death of Louis XVI. Because of his youth he has been called the instrument of Robespierre, with whom he was closely associated throughout the Revolution. But the extreme measures attributed to him were undoubtedly undertaken

through intensity of personal conviction. In 1793 he was made president of the Convention, and in 1794 was responsible for the execution of Danton, Hébert, and Desmoulins. But the Revolutionary Tribunal, whose acts he had so mercilessly directed, was destined to be dissolved. In July 1794 Robespierre and Saint-Just were executed upon the same scaffold by order of the Committee of Public Safety. The political works of Saint-Just were published in 1833-4. Consult: Fleury, 'Saint-Just et la Terreur' (1851); Hamel, 'Histoire de Saint-Juste' (1859); Aulard, 'Les Orateurs de la Législative et de la Convention' (1879-81).

Saint Kil'da, Scotland, an island of the outer Hebrides, belonging to Harris in Inverness-shire and lying 40 miles west of North Uist. It is three miles long by one mile broad with shores rising in perpendicular cliffs from the water's edge. The highest point is Conna-Ghair, a gigantic precipice 1,220 feet high. The richness of the verdure softens an otherwise bleak and forbidding landscape. There are about 40 acres of arable land, and sheep are raised. Sea-birds, petrels, etc., which supply feathers, oil, and meat, form the chief source of income. The fisheries are productive but neglected. The population from 110 to 1851 had dwindled to 71 in 1891. The natives speak Gaelic and inhabit a little village at the head of East Bay.

Saint Kitts, West Indies. See **SAINT CHRISTOPHER**.

Saint-Lambert, **Jean François**, *zhôn frân-swā sǎn lǎn-bār*, **MARQUIS DE**, French philosopher and poet: b. Nancy, France, 26 Dec. 1716; d. Paris 9 Feb. 1803. He was for many years attached to the court of Stanislaus of Poland when that prince lived in Lorraine, and for a time he served in the French army. He won literary recognition by a volume of descriptive verse, 'Les Saisons' (1796), which received extravagant praise at the time but possessed little merit. His present fame seems to rest upon the fact that he was the successful rival in love of both Voltaire and Rousseau. His 'Fugitive Poems' (1759) and 'Stories' (republished 1883) possess considerable merit, and his 'Universal Catechism,' though somewhat materialistic, was approved as a text-book on ethics by the Institute in 1810.

Saint Lawrence, *lǎ'rěns*, an island belonging to Alaska, in Bering Sea, intersected by lon. 170° W. and lat. 63° N. It is about 100 miles long and 34 miles wide, and is about 500 feet, at the highest point, above the sea. It is inhabited by Eskimos who are engaged chiefly in fishing.

Saint Lawrence, **Cape**, Canada, the north-west projection of Cape Breton Island, Nova Scotia, on the Gulf of Saint Lawrence.

Saint Lawrence River and Gulf. The Saint Lawrence River is in North America; its head-waters are about lon. 93° W., and its mouth near lon. 66° W. The total length from the source of the Saint Louis in Minnesota to its entrance to the Gulf of Saint Lawrence at Anticosti Island is 2,200 miles. The area of the basin is about 530,000 square miles. The area of the water surface of the Saint Lawrence River system, including all the rivers and lakes,

SAINT LAWRENCE RIVER AND GULF

is 95,300 square miles. The area of that portion of the basin which is drained by the Great Lakes is nearly 200,000 square miles. The length of the shore line of the Great Lakes and their rivers is 5,400 miles. This system is the only large one in North America whose main stream flows from west to east, and the only large system, except Columbia, whose main stream does not run in the direction of the greatest extent of the continent.

Formation of Lakes.—Prior to the Glacial period the land area of this region was greater than at present, and broad valleys were excavated by the rivers. With but few exceptions the last formed rocks in this great depressed region belong to the latest formations of the Palæozoic strata. The whole region was under ice-cover during the Glacial period. This vast body of ice moved southward, elevations were worn down, the rocks were carved in fantastic designs, new grooves were formed, and the entire topography was changed. In addition to change of form produced by the movement of the great mass of ice, other and equally great changes were made by the vast amount of débris deposited by the glacial drift. Of this débris one peculiar formation is found in the rocks in Ohio, western New York, and other places, where angular and somewhat rounded stones are imbedded in boulders or striated with rocks. Another is the arrangement of the boulders, showing in many places their removal from their original beds. Sand, clay, and gravel, were washed by the streams into long lines, so that in the Saint Lawrence basin great sand belts extend across the country for miles, and are usually found on the lowlands, at the places that were once edges of ice-coverings. The rocks formed before the Glacial period are in some places covered by glacial deposit for from 100 to 200 feet. On the south side of the Saint Lawrence, at the lower foot-hills of the Adirondacks, may be found rock layers considerably below the surface. Old river channels were dammed, old valleys filled up, and new drainage channels formed. The new sub-basins were changed by the glacial deposit and the removal of former divides. The depressions where the Great Lakes are now were formed in part when the southern margin of the glaciers was obstructed north of the divide which extended through New York, Ohio, Indiana, Illinois, and toward the Northwest by the ice-block. The glacier south of the divide discharged its melted waters through streams flowing generally south. The outlets of the glacial streams from the north ice-covering were at first southerly. One was through New York State, near Ithaca, and through a portion of the Mohawk and Hudson River valleys to the Atlantic Ocean. Another was south of Lake Michigan along channels into the Mississippi Valley and to the Gulf. Another was from Lake Erie by way of Fort Wayne. At first there were only small but numerous depressions along the south margin of the northern glacier. They grew broader as the ice retreated slowly, and gradually merged into each other until the vast lake basins were formed which still preserve proof of their age in the Palæozoic strata that has undergone but little change. Mechanical and chemical agencies and erosion removed rocks and graded the lake beds.

The ancient beaches of the early lakes show that at one time the water occupied a greater space than at present. The Iroquois beach, south of Lake Ontario, is quite distinct, and shows that the old lake was much larger than the present Ontario (see *NEW YORK*). The ancient lake is supposed to have extended north to the glacier. There are shore-line marks south of Lake Erie some distance from the present shore line, and from 175 to 220 feet above the lake as it is now. East of Lake Huron are beaches showing a shore line from 25 to 260 feet above the present lake. This record of an ancient large lake is called Algonquin beach. The broad beaches of the ancient lake, of which the present Superior is a part, are on the north shore and extend the whole length. They range from 100 to 600 feet above the surface of the present lake. The soils within the area of the lake-beaches now beyond the lake limits differ from the soils farther inland. They possess many of the characteristics of inundated lands. The beach lands are not alike; near Lakes Ontario and Erie are masses of yellow sands, in some parts approaching a gravel, and between are large clay deposits. The Lake Superior beaches of the old lake show broad clay coverings, pinkish in color. The combined area of the lakes north and west of Superior which flow into Superior, is equal to one of the large lakes. (See articles on each one of the *GREAT LAKES*.)

The Rivers.—The main stream of the system was the last to assume its present form, when the ice covering left the region and the waters began the formation of channels extending to the sea. The streams from the divides gradually made their way to the lowest points of the valley, and entered the main stream. The main outlet channel, or the river Saint Lawrence, may be said to have its source at Lake Ontario and to extend to below Quebec, to the island of Orleans, where it becomes an estuary. From Lake Ontario until it becomes a tidal stream it is a surface river, of which the waters are remarkably clear. The distance from Lake Ontario to the Gulf is 750 miles. The descent from Lake Ontario to tide water is 230 feet. The Saint Lawrence forms the boundary line between the United States and Canada to lon. 74° 15' W., after which its course is wholly in Canada. In width the Saint Lawrence varies from one to three miles, until it broadens into a very wide stream; at Cape Gaspe it is over 50 miles wide. Just after leaving the United States boundary, the river expands and forms what is called Lake Saint Francis, and a little above the city of Three Rivers is another expansion called Lake Saint Peter. The chief tributaries are the Ottawa, Saint Maurice, Saguenay, from the north, the Chaudière, Richelieu, Saint Regis, Racquette, Grasse, and Oswegatchie, from the south. The Richelieu brings to the Saint Lawrence the waters of Lake Champlain. There are numerous beautiful islands in the Saint Lawrence; at the beginning of the main outlet, near Lake Ontario, there is a group (about 1,500 in all) called the "Thousand Islands." These islands are famous summer resorts.

The Estuary and Gulf.—The estuary beginning below Quebec, is 250 miles long, with an extreme width of 35 miles until it flows beyond Anticosti Island, where it widens, as has been

SAINT LAWRENCE STATE HOSPITAL — SAINT LEGER

mentioned, at Cape Gaspé to over 50 miles. The greater part of the Gulf and the estuary are submerged portions of the river valley. A submerged river channel 800 feet wide has been traced to the eastern edge of the continental plain, about 100 miles from the present coast line. The marine shells found in the sands and clays above Montreal show that at one time the estuary began much farther up the stream than at present. The Gulf of Saint Lawrence has its mouth in the large island, Newfoundland. It enters the Atlantic by three channels; Cabot Strait, between Newfoundland and Cape Breton, about 65 miles wide; Strait of Belle Isle, between Newfoundland and Labrador; and Gut of Canso, between Nova Scotia and Cape Breton Island. The principal islands in the Gulf are Prince Edward Island, Magdalen Islands, and Anticosti.

Navigation.—Ocean steamers of the largest size ascend the Saint Lawrence to Quebec, and large vessels go as far as Montreal. Above are several rapids, and in Niagara and Saint Mary's River are falls. Steamers coming down the river often pass through the channels between the rocks of the rapids, but ascending the stream they have to go through canals which have been built to overcome the obstructions to navigation. The Welland Canal (q.v.), in Canada, furnishes a means of going around the Niagara Falls. Two canals, one on the American and one on the Canadian side, have been built at Saint Mary's Falls. Navigation on the rivers and lakes is closed in winter. The average number of days the Lachine Canal is opened during the year is 220. See CANALS; for history, see CANADA; UNITED STATES.

Saint Lawrence State Hospital, a State institution for the insane situated on the Saint Lawrence River near Ogdensburg, N. Y. It is built on the Cottage System (q.v.), and consists of three principal groups and two detached cottages. The central group includes a central administration building and 12 cottages and utility buildings which are detached except for a one story fire-proof corridor to facilitate communication. The cottages are two stories in height and are substantially and beautifully constructed of Potsdam sandstone and limestone. The cottages for men are on the west and those for women on the east of the administration building. The first is called Reception Cottage East or West and it is here the patients are admitted from home accompanied by a trained nurse sent from the hospital for that purpose. Every effort is made to give this cottage a home-like appearance and to avoid the depressing influence of a large institution. There is a cottage for convalescents, the doors of which are never locked and the patients are permitted to come and go at will. Other cottages are for the disturbed and noisy class, for the quiet and harmless, and for working patients. The Infirmary Group and Group Number Three are one fourth mile from the central group and each accommodates about 400 patients of the chronic classes. The Garden Cottage and Farm Cottage are each one mile from the administration building and are occupied by patients who are employed at gardening and farming. The Saint Lawrence State Hospital is chiefly remarkable as one of the first institutions to abandon the Kirkbride or block

system which dominated asylum construction in this country for 50 years and to establish in its stead a simple and more convenient plan. The first medical superintendent was Dr. Peter M. Wise, to whose genius the hospital owes its plan and organization. The hospital was opened for the reception of patients 9 Dec. 1890, but was not completed until 10 years later. It has accommodation for 1,700 patients and has 336 employees. The total expenditures for the fiscal year ending 1 Oct. 1903 were \$276,750.56; annual expenditure per patient, \$161.89. The value of real estate including buildings, \$2,500,600; value of personal property including furniture, etc., \$143,000.

R. H. HITCHINGS,
Superintendent.

Saint Lawrence University, located at Canton, N. Y. It was chartered in April 1856; the theological school was opened in 1858, the collegiate department in 1859; a preparatory school also was organized, but was discontinued in 1864. The collegiate department is unsectarian, the theological school is Universalist; the two institutions are under the control of one board of trustees, but the seminary has a separate building, faculty, and funds. From 1869 to 1872 a law school was conducted, and in November 1903 a Law Department was again established by the incorporation of the Brooklyn Law School as an integral part of the university under the name of the Brooklyn Law School of Saint Lawrence University. The university, therefore, consists of three departments: (1) the college of letters and science; (2) the theological school; (3) the law school. The college offers two courses, one leading to the degree of bachelor of arts, the other to the degree of bachelor of science; the work of the first two years in each course is prescribed, of the last two years largely elective; the bachelor of arts course is divided into three groups, according to the second language (other than Latin) offered for admission. Thirty scholarships are provided. The main departments of study in the theological school are ethics, history, theology, comparative religions, homiletics, sociology, church administration, psychology, and interpretation and criticism; the full course occupies four years. In the law school the two years' course of study leads to the degree of LL.B., the three years' course to the degree of LL.M. All departments of the university are open to women. The buildings on the Canton campus include the main building, the Herring Library, the Cole Reading Room, the gymnasium, and the seminary building. The library contains about 25,000 volumes; the productive funds amount to \$400,000. The students (1910) numbered 200 in the college, and 514 in all departments.

Saint Leger, *saint lěj'ér* or *sil'in-jér*, **Barry**, British soldier: b. 1737; d. 1789. He served in the siege of Louisburg in 1758, and under Wolfe at Quebec, and checked the flight of the French forces at the Heights of Abraham. He was also the leader of the expedition against Fort Stanwix in the American Revolution. At the close of his career in the British army, in 1784, he was commandant of the royal forces in Canada. His 'Journal of Occurrences in America' was published in London in 1780.

SAINT LOUIS

Saint Louis, *sant loo'is* or *loo'i*, Mo., city, port of entry; on the west bank of the Mississippi River, about 20 miles below the mouth of the Missouri. It is the metropolis of the State, and by the Federal census of 1910 ranks fifth in population among the cities of the United States.

Topography.—The city stands on a gentle bluff with an average elevation of 100 feet above the river and about 500 feet above the sea. It stretches along the Mississippi a distance of 19 miles, and its greatest width, east and west, is six and one half miles; the area is 61½ square miles. The surface is rolling and drainage by the city sewer system has been easily accomplished. "Mill Creek" Valley, which extends east and west and bisects the city was once the bed of a lake (Chouteau Pond). It is used chiefly for depots, railroad yards, and industrial establishments. Bridges and viaducts carry street traffic across the valley. The Mississippi River borders the city in the form of the arc of a circle, the city on the concave side. In the river are several islands; the largest Cabaret and Kerr belong to Illinois. The river is here a vast torrent of turbid water which picks up and drops again large masses of sand and silt as the river rises and falls. It is very deep abreast the city, and in good water there is a continuous depth of 12 or 14 feet all the way to the Gulf of Mexico. It regularly rises and falls during the year about 25 or 30 feet. High water mark is 412.7 feet above sea-level. The historic water mark of 1844 still remains unsurpassed, though in June 1903 the water was but four or five feet lower. In each case the broad bottom between the channel and the Illinois bluffs was flooded and looked like a vast inland sea. In no case has the river climbed far up the bluff upon which Saint Louis is built. West of the city the land spreads out in a picturesque plateau.

Climate.—The latitude of the city is about 38° 38', so that it is entitled to a mild winter and a warm summer. Fair summer winds are south and southwest, and the cool winds come from the north and northwest. The record of the United States Weather Bureau is here given for the highest and lowest temperature for the twelve months, January to December, 1909, and the normal or mean temperature, respectively:

Jan., 74°, 22°, 31°	May, 94°, 32°, 66°	Sept., 102°, 37°, 70°
Feb., 78°, 18°, 34°	June, 102°, 44°, 75°	Oct., 91°, 24°, 58°
Mar., 90°, 3°, 44°	July, 107°, 55°, 79°	Nov., 82°, 5°, 43°
Apr., 91°, 22°, 56°	Aug., 100°, 52°, 77°	Dec., 74°, 17°, 36°

The annual rainfall is 37.3 inches. The longitude of the city is about 90° 15' west from Greenwich; hence "Standard Central" time is about one minute faster than "Mean Solar" time.

Transportation.—In 1874 the Eads Bridge (q.v.) was opened for highway and railroad traffic. Prior to 1874 Saint Louis had no bridge over the Mississippi, and in times of ice gorges and ice-runings direct communication with the East, at this point, was cut off for days. The Merchants' Bridge, three miles up-stream from Eads Bridge, was built in 1890. Twenty-seven lines of railroad meet in Saint Louis Union Station; 10 from the west and 17 from the east, the latter crossing the river by the

Eads Bridge and the Merchants Bridge. Vast quantities of freight cross the river by ferries and are handled by steamboats. Nearly all the coal used in the city crosses the river or comes up the Mississippi in barges. Terminal facilities have lately been greatly increased and the tunnel running from the Eads Bridge to Cupples Station is used for merchandise almost exclusively.

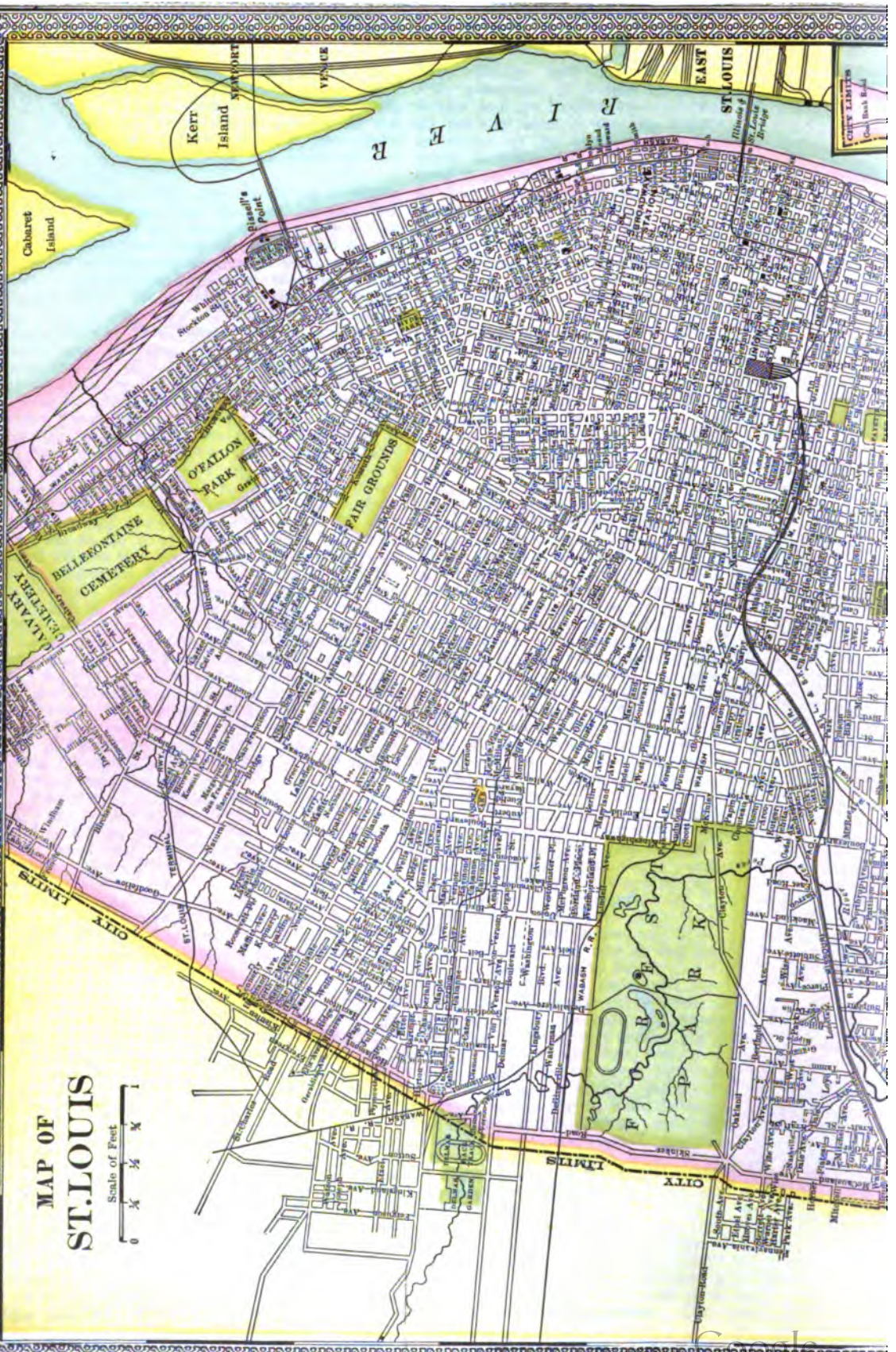
The Union Station with its spacious train shed large enough to house 32 tracks, each one long enough to accommodate 11 passenger coaches, is unique in construction and use. All trains "back in" to the station, stopping at the Midway, an area 130 feet wide and 601 feet long, crossing the station from 18th to 20th streets. Freight, mail matter, and express are handled in subterranean driveways and passages, with the use of 26 elevators. The station covers 13.2 acres of ground. The capacity of the station has recently been increased 200 per cent.

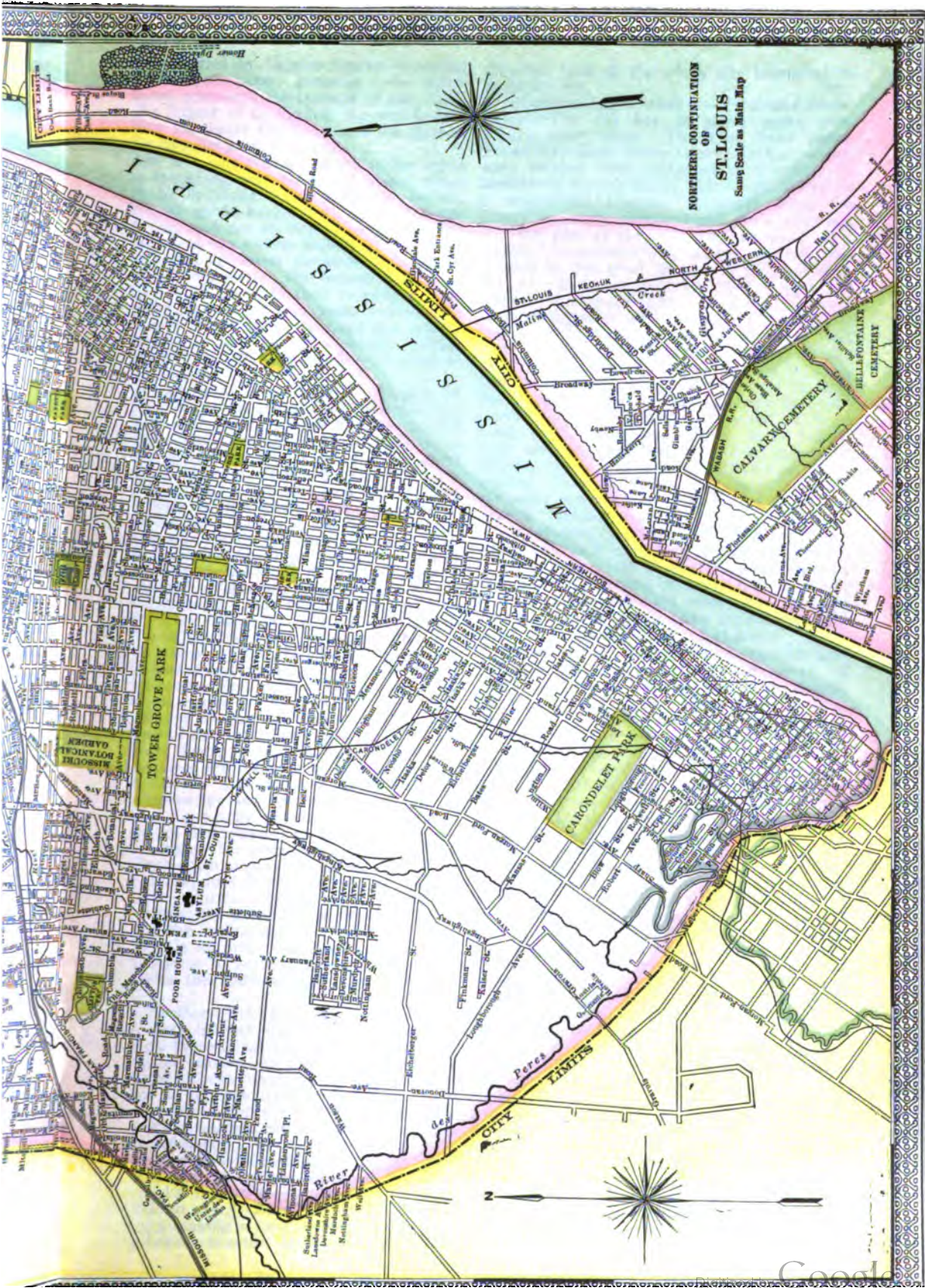
Commerce and Industries.—Saint Louis is the natural commercial metropolis of the territory lying to the west and south, including Texas and Mexico. In manufactures it has always been prominent, and it is now the fourth city in the United States in the value and output of its manufactures. The value of the products of the factories of Saint Louis is estimated at about \$400,000,000. If the factories of East Saint Louis, Venice, Madison, and Granite City, all lying just across the river and forming parts of this industrial centre, are included, the annual product amounts to about \$400,000,000. The annual sales in dry goods and kindered lines amounted to \$120,000,000; the sales of boots and shoes alone amounted to \$50,000,000, nearly one half of the stock being made in the city. The trade in tobacco and cigars, nearly all manufactured here, footed up \$41,000,000; in beer, \$18,000,000; in street cars, \$15,000,000.

The most interesting and the most important commercial feature in Saint Louis is Cupples Station, which deserves an extended description. There is not in the world a similar establishment which approaches it in magnitude and completeness of organization. Cupples Station was planned and inaugurated by Robert S. Brookings, the vice-president and general manager of the Cupples Wooden Ware Company. The object of the station was to save expense, time, and wear and tear in handling merchandise. Expense was to be saved chiefly by the elimination of drays and street wagons drawn by horses. Time was to be saved by reducing the handling to one half, and storing goods in buildings adjoining the station platforms. The saving in wear and tear was to result from less handling and no street hauling. All these ends have been attained. All the 25 lines of railroad converging in Saint Louis haul freight to and from the terminal yards lying between Eighth Street and Grand Avenue. Cupples Station occupies nearly four acres of ground at the east end of the yards on both sides of the main tracks as they leave the tunnel at Eighth Street and Clark Avenue. It owns and controls switches and platforms sufficient for 60 cars, all practically under cover. The 20 big buildings skirting the tracks are occupied by some 30 tenants, including some of the largest concerns in the city dealing in hardware, woodenware, and groceries. The total mer-

MAP OF ST. LOUIS

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chandise handled by Cupples Station is valued at about \$40,000,000 annually, of which \$25,000,000 represents the business of two firms, each the largest of its kind in the world,—the Simmons Hardware Company, and the Samuel Cupples Woodenware Company.

There is a single power-plant for the entire station furnishing heat, light, and power, either electric or hydraulic. The platforms for the handling of goods have a total area of 50,000 square feet, and are on two levels, one by the car doors, and one a story higher. These levels are connected by seven elevators operated by the station employees. The tenants operate 44 elevators to all floors in their respective quarters. The station has over 4,000 four-wheeled trucks, each easily drawn by hand and capable of carrying a load of 5,000 pounds. These trucks carry all the merchandise handled in Cupples Station.

The manner of operating the station is as follows: During the night the various railroads having freight to deliver to Cupples Station place their cars upon the switches adjacent to the lower platforms. At 7 A.M. a force of about 100 station employees open and unload the cars, place the goods upon trucks, and deliver them at the doors of the tenant firms according to their destination. By 9 A.M. the cars are empty, and the goods are for the most part piled away in the respective buildings. Soon the trucks begin to reappear loaded with goods which are to be shipped. These are taken in hand by the station employees in the freight-receiving room on the upper platform; bills of lading are signed; and the trucks are sorted according to a schedule which specifies the order in which cars shall be loaded and immediately removed by the different roads. Each railroad knows just when to send an engine for its cars, and the station forces always see that the cars are ready. The employees of the tenant firms go scarcely beyond their own doors. About 25 per cent of the goods received are delivered at the street doors of the various firms to meet local demands. In this systematic and economical way over 50 cars with 1,000 tons of assorted merchandise are received and shipped in a day, or 300,000 tons in a year. No other single freight station approximates that amount of business. The sight of the station in full activity is most impressive. The constant passing of hundreds of loaded trucks; the simultaneous motion of many elevators; the loading and the despatch of cars,—all this is at first confusing, but a deeper insight detects a perfect, harmonious system which wins the admiration of every attentive visitor.

One further fact remains to be stated, namely, that Samuel Cupples and Robert S. Brookings, the original owners and builders of this great enterprise, and the owners of several neighboring blocks occupied by firms which could not be accommodated in the station, have given the entire property to Washington University, as a permanent endowment for the cause of higher education.

Banks and Trust Companies.—Not to mention the smaller banks, the capital of 20 of the larger banks and 10 trust companies in 1902 amounted to \$42,315,800; their surplus was \$44,951,373, making a total of \$87,267,173. The clearing-house statement shows that the clear-

ings for 1910 of the whole city amounted to \$3,704,263,700.

Municipal Improvements—Parks and Boulevards.—The city has 18 public parks, containing 2,125 acres. The four large parks, Forest, O'Fallon, Tower Grove, and Carondelet, have recently been connected by a system of boulevards carried across Mill Creek Valley on a magnificent viaduct. Lafayette Park (30 acres) was early improved and seven years ago was the gem of the city. Its wealth of elms, maples, sycamores was almost entirely destroyed by the great cyclone of 27 May 1896. Out of 792 forest trees 575 were broken and ruined. During the season which followed over 1,000 young trees were set out, to begin again the work of rearing a forest of ornamental trees. The cyclone destroyed property in the city to the amount of ten million dollars, and killed some 160 people. Shaw's Garden, the popular name of the Missouri Botanical Garden, was the gift to the people of Saint Louis of the late Henry Shaw. It is beautifully laid out, and full of a vast variety of flowers, trees, and shrubs, collected at great expense from all lands, and most carefully cultivated and housed. The Flower and Plant Garden contains 9.4 acres; the Arboretum, which contains specimens of all trees known which are hardy enough to survive the climate, covers 20.5 acres; the Fruticetum, which contains an extensive collection of hardy fruit trees and plants, extends over eight acres; other grounds near and tributary to the Shaw residence amount to 6.8 acres, making a tract of 45 acres.

Adjoining the Arboretum and vegetable garden is a pasture area of some 80 acres, of which one fourth has recently been graded, drained, supplied with water, and partially planted with North American plants arranged in the familiar sequence of families adopted by Bentham and Hooker; while the remainder will shortly be molded and planted to exemplify the more modern arrangement of Engler and Prantl, on plans already largely prepared. The Botanical Library contains 18,550 books, 22,608 pamphlets, and 66 manuscript volumes. The herbarium contains 400,000 sheets of specimens.

The ownership of the Missouri Botanical Garden is vested in a board of trustees which is charged with the care and maintenance of the garden and the administration of income-bearing property valued at some \$4,000,000, the net income of which shall be spent upon the garden. With this munificent endowment the trustees are able to constantly improve, extend, and enrich the garden. The Henry Shaw School of Botany is conducted as a department of Washington University.

Tower Grove Park contains three fine bronze statues: Shakespeare, Humboldt, and Columbus, designed and executed by Müller of Munich, the gifts of Henry Shaw. Forest Park, two miles long by a mile in width, was a wooded tract of great variety and rare beauty, but one half of it has been loaned to the Louisiana Purchase Exposition Company, and what was for the most part an irregular grove of magnificent forest trees is now covered by a series of exposition buildings, which in extent and splendor stand unrivaled on the face of the earth. The winding Des Peres River is buried

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out of sight; the little lake is filled and covered with magnificent palaces. A mile of lagoons with curving banks of grass and flowers, and many a springing bridge, fill the scene with an amazing wealth of beauty and variety, utterly and entirely new—so great and wonderful is the transformation.

Of all the exposition structures now standing within the limits of Forest Park only the Art Building is to be permanent.

The City Waterworks.—The city waterworks consist: First, of a pumping station and settling basins several miles above the city proper, on the west bank of the Mississippi, a few miles below the mouth of the Missouri. Second, of a conduit leading the water from the settling basins to the pumps at Baden and Bissel's Point. Third, the high-service pumping engines, where the water is pumped into the city mains or into Compton Hill Reservoir, several miles away to the south. Fourth, a system of pipes along every street and to every house, so that the supply is abundant everywhere. All old wells are filled and spring water is no longer used. A water tower near the reservoir furnishes high-pressure water through a separate system of pipes to residences on high ground. The capacity of the works at present is 120,000,000 gallons per day. The average daily consumption is 67,179,600 gallons, or at the rate of over three barrels per day for every man, woman and child in the city. The total length of all underground water pipes of all sizes is over 700 miles.

The Mississippi water coming from northern lakes and from the distant slopes of the Rocky Mountains, though heavily laden with mineral matter and more or less stained with vegetable matter from alluvial fields and forests, was until recently exceptionally wholesome, and when filtered was as clear as crystal. The drainage of river towns and mills was of course objectionable, but before the time when the city of Chicago, with a population exceeding the whole State of Missouri outside the limits of Saint Louis, poured its drainage through the Illinois River into the Mississippi, 40 miles above Saint Louis, the water pumped at Saint Louis was considered excellent. The present condition of the water is unsatisfactory in the extreme. Plans are being made to filter the entire water supply of the city and to eliminate, by legislation or otherwise, the vast evil of Chicago sewage.

The income from the "water rates" can be spent only in the water department. The unappropriated balance on hand in April 1903 was over \$2,000,000, nearly sufficient to build a filtration plant which shall filter all the water used.

Sewers and Streets, Street Cars, etc.—There are 530 miles of sewers and 450 miles of paved streets. The streets are in general macadamized, but about 110 miles are paved with granite blocks, asphalt, or brick, and there are 85 miles of Telford pavement dressed with fine hard gravel. All streets are sprinkled daily throughout the summer months, and the granite and brick pavements are swept and washed. The city is not densely built, as good building ground is abundant; consequently the residence districts extend far into the country. This extension is favored by an admirable supply

of street railways and cars. There are 337 miles of single street tracks at present, under two separate managements. All cars are run by electricity, with overhead trolleys, and the system of transfers is quite general. At present there are no underground or elevated electric roads in Saint Louis.

In numbering the houses one hundred numbers are assigned to each block, counting westward from the river, and north and south from Market Street. The odd numbers are on the north and west sides. Thus, 2305 Pine Street is on the third house lot west of 23d Street, on the north side of Pine Street.

Education.—The public schools are administered by a Board of Education which is independent of the city government, having its separate charter, and by the Constitution authorized to levy and expend taxes for school purposes. The rate of school tax is by the Constitution of the State limited to six mills on a dollar. The tax actually levied by the Board of Education in 1903 was five mills. The board consists of 12 members elected for six years on general tickets embracing the entire city; four members retire every two years unless re-elected. The expert officers charged with the business of conducting the schools under the authority and supervision of the board are: a superintendent of instruction, a secretary and treasurer, an auditor, a commissioner of buildings, and a supply commissioner.

A normal school is in course of construction which will receive 300 pupils; there are three first-class high schools, with accommodations for 4,000 pupils; a colored high and normal school for 300 pupils; and 91 district schools, of which 12 are for colored children under the care of colored teachers. The enrolment for day schools in 1910 was 87,931; for evening schools, 3,353. The number of teachers was 2,027. The cost of maintenance for every pupil in the day schools is about \$21.

The estimated revenue for public schools from all sources, including its quota from the income of the State school fund (\$202,251.16) is about \$3,000,000.

The first year of the school course is devoted to kindergarten instruction and training in 78 kindergarten rooms, specially built and fitted for the purpose. Book work may begin in Grade I. at the age of seven. At the end of the VII. Grade, at the normal age of 14, the child should be fitted for a high school. In the high schools, pupils may choose a classical course, a general literary and scientific course, or a mixed course, including manual training or domestic art and science. In the two highest grades of the district schools the pupils receive one lesson per week in manual training—the boys in mechanical drawing and elementary woodwork, the girls in domestic science (sewing, cooking, and household economics). There is a school for the deaf, enrolling 34 pupils and five teachers.

All day schools are taught 40 weeks a year. There is no law compelling school attendance in Missouri, consequently in spite of a high degree of excellence pervading all grades of the public schools, a few children are allowed to grow up in ignorance. The superior quality of the public schools of Saint Louis is a matter of common observation. This is due to teachers

ST. LOUIS.



1. A view in Shaw's Garden.
2. The St. Louis Bridge over the Mississippi river.

SAINT LOUIS

thoroughly trained and carefully supervised; and to buildings well equipped. Appointments and reappointments are on merit alone. School houses are now built strictly fire-proof, with every valuable modern convenience.

A vigorous Pedagogical Society containing 400 members, chiefly public school teachers, marks progressive ideas; and a Teachers' Benevolent Annuity Association, with 1,109 members, indicates a desire to co-operate and render mutual aid. The members pay one per cent of their salary as annual dues, and after 25 years of service as teachers (15 in Saint Louis) the women (for men the service is 30 years) may on retiring receive an annuity for life. Twenty persons at one time received annuities. The association has invested a permanent fund amounting to \$48,696.50. This is increased every year by dues, gifts, and an occasional festival held for the purpose, and with such aid this work is being extended.

Washington University is a generously endowed and finely equipped institution for higher and professional education. The charter of the university was signed by the governor of the State on 22 Feb. 1853, hence the name "Washington." It was originally called Eliot Seminary, in honor of its organizer, first president, and third chancellor, Dr. William Greenleaf Eliot. By the terms of its charter the university is strictly non-partisan in politics, and non-sectarian in religion. Hence certain questions are never asked when a professor's chair is to be filled or a tutor is to be appointed. The College was inaugurated in 1857; the Law School was organized in 1867; the Engineering Department in 1870, and Architecture was added in 1900. The School and Museum of Fine Arts became a department in 1879; and the School of Botany in 1885. The Saint Louis Medical School (founded in 1842) was admitted to the university in 1891. The Missouri Dental College was admitted in 1892. In 1899 the Missouri Medical College (founded in 1840) was admitted, forming with the Saint Louis Medical College the Medical Department of the university.

Prior to 1903 the university had no campus; its nine departments were scattered about the city on different blocks and on several streets. The large campus of 113 acres and a group of 11 beautiful granite buildings, erected by the university and occupied during the Fair by the officials and attachés of the Louisiana Purchase Exposition, became the permanent home of the Undergraduate Department in 1904. As additional buildings are needed they will be placed on lines indicated, thus forming a succession of quadrangles from east to west.

The secondary schools: Mary Institute, for girls, and Smith Academy and the Manual Training School for boys, are permanently located north of Forest Park, about a mile and a half from the university campus. The Manual Training School was established by ordinance 6 June 1879, and opened as an independent school, with a complete course of study and training for boys of secondary grade in September 1880. For 25 years it occupied the original building at 18th Street and Washington Avenue. It enrolls annually about 300 boys. The total enrollment in the university is 2,219 students, and 209 instructors. Its property in educational

buildings, grounds and equipment is \$2,570,000; its endowment \$5,180,000.

The Saint Louis University (Roman Catholic), which dates back to 1829, is a large and flourishing institution on Grand Avenue. Its library of about 38,000 volumes is rich in old books in many languages, huge in size and quaint in binding; the Christian Fathers in Latin, Luther's first editions, the Bible in 21 different languages, are interesting examples. One hundred and nineteen quarto volumes, the gift of the English government in 1831, contain the "Records of the English Government" starting with 'Doomsday Book' and ending with George IV.

The College of Christian Brothers (q.v.) occupies a most imposing structure on the high ground west of Cote Brillante. Forest Park University for young ladies occupies a most attractive building and site immediately south of Forest Park. There are several independent medical schools, a college of pharmacy, a law school, giving instruction exclusively at night, and numerous convents, seminaries, and parish schools.

Libraries.—The Public Library, with 170,000 volumes, is free to all residents. The city contributes annually the income of a tax of $\frac{1}{2}$ of a mill, yielding in 1903, \$166,000. Andrew Carnegie has generously given \$1,000,000 for the erection of a central library building and branches; the branch libraries to be built in different parts of the city. The erection of these buildings was begun in 1905. A site for a branch library has been presented by Mr. and Mrs. William Barr. There are scattered throughout the city 59 delivery stations for books. The Mercantile Library, containing 127,000 volumes, offers special favors to clerks, and is housed near the commercial centre of the city. It is provided with a fine reading room and a list of 562 periodicals. The present number of annual memberships is 1,603; of life memberships, 516; and of perpetual memberships, 1,310. The walls and niches of the reading room and lobby are decorated by 57 works of art: paintings and statues.

Government and Finance.—The mayor, the council (13) and the house of delegates (28) are elected for four years; the councilmen at large, and the delegates one from each ward. A Board of Public Improvements, consisting of a president, a water commissioner, a street commissioner, a sewer commissioner, a harbor commissioner, and a park commissioner, is organized every four years. All the commissioners are appointed by the mayor and confirmed by the council. The three commissioners first named must be educated engineers. The Board of Police Commissioners (excepting the ex-officio member, the mayor) and the Board of Election Commissioners are appointed by the governor of the State, and are quite independent of municipal control, though all their bills must be paid by the city, the penalty for a negative vote on such bills in the city council being disfranchisement.

The assessed value (real and personal) of the city in 1910 was \$504,391,890. The public debt was \$23,853,178.30; and the tax rate \$2.22 per \$100. The year of the World's Fair the bonded debt was \$23,900,000, includ-

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ing \$5,000,000 given in bonds to the Fair. The city's revenues are about \$10,000,000.

Hotels.—St. Louis is well provided with over 100 hotels, large and small, with accommodations for 21,000 guests. The Planters, The Southern, and The Lindell are first-class in all respects, being new buildings with old names on old sites. During the year 1903 new hotels are going up with capacity for 47,000 guests; many of these, like the Washington, Hamilton, and Jefferson, will be permanent and first-class. A novel feature of the Fair is an "Inside Inn," 400 by 800 feet, capable of receiving 6,000 guests, within the Fair grounds, so that visitors may actually live within the gates.

History.—Saint Louis was founded 14 Feb. 1764, by a party of Frenchmen under Auguste Chouteau, a 14-year-old boy, who had been sent up from New Orleans by his step-father, Pierre Laclède Liguist, to establish a settlement on a site already selected as a post for trading with the Indians. The little village was named in honor of Louis IX. of France. By secret treaty France had already, in 1763, ceded the entire territory west of the Mississippi to Spain, but no knowledge of the treaty was received in Louisiana for some years, and the settlement remained French. In 1765 Saint Louis was made the capital of Upper Louisiana, with Saint Ange de Bellerive as governor. In 1769 the village of Saint Louis contained 17 white men, 16 white women, and 17 negro slaves. In 1770 the Spanish took formal possession, and Don Pedro Pierras was inaugurated governor 29 November. The village remained under Spanish control for 33 years. By another secret treaty Spain ceded the territory back to France, 1 Oct. 1800, and on 30 April 1803 Napoleon sold the entire territory to the United States. (See LOUISIANA PURCHASE.)

The formal transfer of Upper Louisiana from Spain to France took place on 9 March 1804. Capt. Amos Stoddard of the United States army had been commissioned by the French Republic to receive the territory from the Spanish governor, Delassus. On the next day, 10 March 1804, Capt. Stoddard in the presence of a few apathetic French people and a company of United States troops lowered the flag of France and raised the Stars and Stripes and assumed control of Upper Louisiana in the name of the United States. It is said that the only demonstration attending this ceremony was a call for three cheers for the new authority by a prominent citizen, Charles Gratiot. Thus for 40 years Saint Louis had been under France and Spain. General (afterward President) Harrison, who a few months later was in command of the United States post at Cahokia, Ill., organized the new local government. The population at that time was about 1,000 whites and 300 or 400 slaves and free mulattoes.

No sooner was the Louisiana Territory a part of the United States than settlers swarmed across the great river, and in a few years emigrants from Germany in great numbers settled in and near Saint Louis, so that the French became a small minority of the population; but the memory of the early families is well preserved in the names of streets, schools, and parks. The names of Laclède, Chouteau, Gratiot, St. Ange, and Stoddard have already

been mentioned. Carondelet, Gravois, La Salle, Papin, Cote Brillante, Dodier, Soulard, Ceré, Lucas, Dillon, Lafayette, Dozier, Des Peres, Marquette, and others, are reminders of the early history of the city and Territory. King's Highway, an avenue destined to be one of the most beautiful in the city, is a relic of the broad highway originally laid out for the King of Spain, running on the king's land from the rear of Saint Louis village to New Madrid, hundreds of miles south. The pseudonym of "Mound City" arose from the fact that on the east side of Broadway at about Mound Street, there was formerly an immense Indian burial mound; it was removed in 1866.

The War of the Revolution was fought to a finish without causing a ripple in the little French village with its Spanish governor. During the War of 1812, the town was aroused to military activity by rumors of hostile Indians incited by British agents. During the Mexican War the city contributed a regiment which was intended to join General Taylor's army; and sent a company to General Kearney's force of Missouri troops which took possession of New Mexico, and later, under Colonel Doniphan made a long and brilliant march into northern Mexico. (The exploits of this regiment are fully given in the book entitled 'Doniphan's Expedition.') The other regiment returned in a few months, having seen no active service. The first steamboat to land at Saint Louis reached the levee 2 Aug. 1817, which event marked the beginning of its great career as a centre of trade. John Jacob Astor located his western headquarters here for the fur trade in 1819.

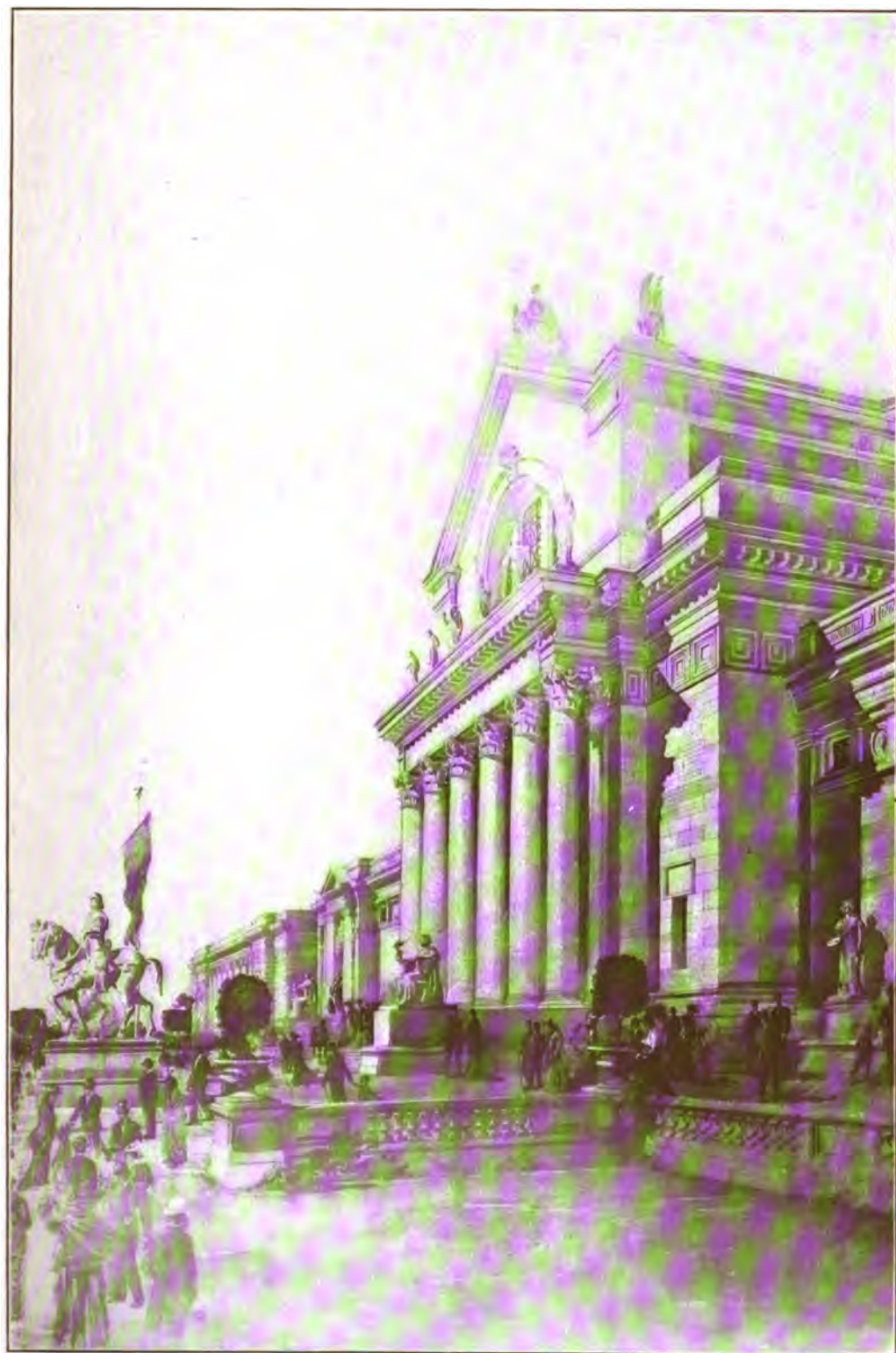
Thomas H. Benton, who for 30 years represented Missouri in Congress, began his public career as editor, statesman, and politician, in Saint Louis in 1820. His fatal duel with Charles Lucas, in 1817, was one of the saddest events in the city's history. He is now remembered as the great advocate of a railroad to the Pacific, and on the pedestal of his monument, which faces to the west in Lafayette Park, are these words: "There is the East, there is India."

The Missouri Pacific Railroad, the first built on Missouri soil, was opened in 1854.

During the Civil War Saint Louis, though never a battle ground, was the base of supplies for Union forces from the days of Camp Jackson, when Captain Nathaniel Lyon and Frank P. Blair, with several regiments of volunteers, made prisoners of two regiments of State militia which had been called into camp by Governor Jackson with hostile intent; they thus ensured the safety of the United States arsenal and its large supply of guns and ammunition. Under General Frémont Saint Louis was put into a state of defense, and a cordon of forts surrounded the city on the west.

The first iron-clad gunboats of the United States were built at Carondelet (now South Saint Louis, incorporated into the city in 1870) by Captain James B. Eads, in 1861. These gunboats played an important part in the capture of Confederate strongholds on the Mississippi River, aiding in the capture of Island No. 10, Vicksburg, and Port Hudson.

The Western Sanitary Commission was organized in Saint Louis in September 1861, to



MAIN ENTRANCE TO THE ART PALACE, ST. LOUIS EXPOSITION.

SAINT LOUIS—SAINT MARC

care for sick and wounded soldiers. James E. Yeatman was the president and Carlos S. Greeley treasurer. The work of this commission extended over many fields and was remarkably efficient. In money and sanitary stores the commission received and spent or distributed over \$4,000,000 worth of supplies for soldiers in hospitals and military camps. At a single fair in Saint Louis, lasting six days, \$554,591 was realized for the commission.

In 1865 negro slavery ceased in the city and State by act of a State convention, called to take action upon the subject of emancipation.

The population of the city in 1900 was 575,238, and in 1910, 687,029, representing a gain of 19.4 per cent over 1900.

CALVIN M. WOODWARD,
Washington University.

Saint Louis, Senegal, West Africa, the capital of the colony known to the natives as Timbuktu or N'dar, is on a small low island near the mouth of the Senegal River. The principal buildings are the cathedral, the great mosque, court-house, barracks and government buildings, bank, chamber of commerce, public library, printing office; and there is an agricultural society. The gardens of the suburbs and the avenues of palms are attractive features of the town. There are large warehouses, and an extensive trade in gums, earthnuts, etc. Water is supplied by an aqueduct $7\frac{1}{2}$ miles in length. Pop. 20,200.

Saint Louis University, The, located at Saint Louis, Mo., and the oldest university in the Louisiana Purchase Territory, was founded by Jesuit missionaries from Maryland; the beginnings were made at Florissant, Mo., in 1823, when a school for the education of the Indians of the Missouri Territory was established at the request of President James Monroe and the Hon. John C. Calhoun, his secretary of war. This school was transferred to Saint Louis in 1829, and classes were opened there for white students in 1829. In 1832 the institution was chartered as a university by Act of the legislature of Mississippi. In 1842 a medical department was added and in 1843 a school of law. The schools of philosophy and divinity were organized in 1857. In 1888, owing to the encroachments of business, the university was moved to its present quarters and the various departments were erected on the new site with the exception of the school of medicine (1903), which is situated one mile distant. The organization of the university now consists of the College, the Academy, the Commercial Department, Military Science, Normal School, School of Philosophy and Science, School of Divinity and School of Medicine. The College offers two courses, the classical, leading to the degree of A.B., and the scientific, leading to the degree of B.S.; the School of Philosophy and Science offers two courses, the philosophical, in which the Latin language and the scholastic method are used, and the scientific, including instruction in mechanics, the sciences, and mathematics, with laboratory work. The course of Divinity extends over a period of four years, leading to the degree of Doctor of Divinity. The Military Department is under the management of an officer of the United States army and military drill is

obligatory on all undergraduate students. Religious instruction in Catholic doctrine forms part of the various courses; non-Catholic students, however, are exempt if they so wish.

The buildings (1910) are: The College, the Academy, the School of Divinity, the School of Philosophy, the School of Medicine, and the Normal School. The Library contains 42,000 volumes, including the library for undergraduates; there are also departmental libraries in theology, philosophy, science, and medicine. The productive funds in 1910 were \$30,000, the students numbered 1,247 and the faculty 210.

J. C. BURKE,
Librarian.

Saint Lucia, one of the Windward Islands, British West Indies, lying south of Martinique; area, 233 square miles. The surface is rugged and mountainous, the mountain sides being mostly covered with dense forests; the valleys and lower heights are fertile and well cultivated. The chief products are sugar, cocoa, and logwood; coffee and tobacco are also raised, and rum is manufactured and exported. The climate is healthful except in certain low, marshy districts. The island was discovered in 1502, colonized by the French in 1563, was claimed by both England and France, and until 1803 its possession was several times exchanged between the two. In 1803 it was definitely ceded to England, and became a part of the government of the Windward Islands. In 1901 there were 44 government schools. Castries, the capital of the island, is one of the most important ports and the second British naval station in the West Indies.

Saint Lucie Grass. See GRASSES IN THE UNITED STATES.

Saint Luke, Guilds of, were associations of painters organized in mediæval times under the patronage of Saint Luke. The guilds flourished for many years in Holland and admitted as members engravers, printers, and other artists.

Saint Malo, sǎn-mǎ-lō, France, in the department of Ille-et-Vilaine, at the mouth of the Rance, on the English Channel, occupies a rocky island, 43 miles northwest of Rennes. It communicates with the mainland by a causeway called Le Sillon. The harbor affords a total quayage of more than two miles. The principal buildings are the custom-house, chamber of commerce, the parish church of the 15th century, school of hydrography, the Hôtel-de-Ville, with a museum and library; the Casino and statue of Chateaubriand before it, and the ancient castle. The manufactures are hosiery, nets, sailcloth, cordage. It is an important seaport, and ship-building is one of the chief industries. There is trade in corn, fruit, wine, and provisions, chiefly with England. Pop. about 14,000.

Saint Marc, Fr. sǎn mǎrk, Haiti, town on Saint Marc's Bay, on the west coast, 44 miles northwest of Puerto Principe. Near the town is a headland known as Crête a Pierrot, which was strongly fortified by English engineers, and occupied by native soldiers in the war of independence, who here made a strong resistance against the French. It is the shipping port for a fertile valley and exports chiefly coffee and

SAINT-MARC-GIRARDIN — SAINT MARY'S CHURCH

logwood; the town also contains several distilleries. Pop. 20,000.

Saint-Marc-Girardin, sǎn mǎrk zhê-râr-dǎn, **François Auguste**, French statesman and author: b. Paris 12 Feb. 1801; d. 11 April 1873. He was educated at the Collège Napoléon and at the Collège Henri IV., and in 1834 occupied the chair of poetry at the Sorbonne. His political life began also at this time as a member of the Chamber of Deputies. In 1871 he was elected to the National Assembly, and was its vice-president at the time of his death. Among his best known books are: 'Political and Literary Notes on Germany' (1835); 'Essay on Literature and Morals' (1845); 'Course of Dramatic Literature; or, The Use of the Passions in the Drama' (1843-77); 'La Fontaine and the Fabulists' (1867); and 'Jean Jacques Rousseau, His Life and Works' (1875).

Saint Mark, Column of. See **VENICE**.

Saint Mark's Church (San Marco). See **VENICE**.

Saint-Martin, sǎn mǎr-tǎn, **Louis Claude**, French philosopher: b. Amboise, France, 18 Jan. 1743; d. Aurai, near Chatillon, 14 Oct. 1803. He traveled through Germany, England, Switzerland, and Italy, making converts to his mystical philosophy, which he had derived from a study of the works of Jacob Böhme. His followers styled themselves "Martinists" and held that man on one side of his nature was a type of the universe, a microcosm; on the other the thought and reflection of God. By introspection all knowledge and wisdom could be reached. Of his works the most important are 'Des Erreurs de la Verité' (1775); 'De l'Esprit des Choses' (1800); 'L'Homme de Desir' (1790). Consult: Caro, 'Essai sur la Vie et la Doctrine de Saint-Martin' (1852); Matter, 'Saint-Martin le Philosophe Inconnu' (1864).

Saint Martin, sǎnt mǎr'tin (Fr. sǎn mǎr-tǎn), an island of the Lesser Antilles, lying north of the Leeward Islands, and east of Porto Rico; area, 37 square miles. Its surface is hilly, the elevation being highest in the centre of the island. In the southern part are several salt lagoons from which considerable quantities of salt are obtained. Sugar is the chief agricultural product, rum is manufactured, and sugar, rum, and salt are the chief exports. The island was settled in 1638 by French and Dutch, who were later driven out by the Spaniards. In 1648 they regained possession and divided the island between them, the French taking the northern portion (20 square miles); and the Dutch the southern portion (17 square miles); the French portion is a dependency of Guadeloupe, the Dutch, a dependency of Curaçao. Pop. 6,000.

Saint Martin's Day. See **MARTIN I., SAINT.**

Saint Mary, Ohio, city in Auglaize County; on the Lake Erie & Western, Toledo & Ohio Central, and the Western Ohio Traction line; about 25 miles southwest of Lima. It was settled in 1795, by whom is not positively known; but some county historians give the credit to Charles Murry. It was incorporated in 1820, and became a city under the new code, June 1903. It is in an agricultural region and in the oil belt, but it has large manufacturing interests. The chief manufacturing establishments are chain

works, with 175 employees; spoke works, 250 employees; woolen mills, 75; machine shops, 150; box factory, 60; straw board works, 25; other smaller factories employ about 100. The total number employed in all the manufactories is about 1,000. There are eight churches; and the educational institutions are public and parish schools and a business college. The three banks have a combined capital of \$180,000; the annual amount of business is \$1,200,000. There are two building and loan associations, one daily and two weekly papers. The government is vested in a mayor, council, and marshal. The council is composed of four members and three at large, who hold office two years. Pop. (1900) 5,359; (1910) 5,732.

W. D. MEFFERD,

Editor 'Saint Mary's Graphic.'

Saint Mary Hall, originally this was the parsonage-house of the rectors of Saint Mary's Church, Cambridge University, until it was presented by Edward II. in 1326 to Oriel College. It then became a university hall, and the office of principal was held by Oriel fellows to 1656, from which time the chancellor exercised right of nomination. In 1902 it was reunited with Oriel, in which its site, buildings, and property are now vested.

Saint Mary's, Md., the first settlement made in the State. In 1634 Governor Calvert in his ship, the Ark, sailed up the Potomac to Saint Mary's River, and bought land of the Indians and established a settlement near the mouth of the Saint Mary's. A Jesuit mission was established; many of the settlers, however, were Protestants, and absolute liberty of conscience of worship prevailed. Though Saint Mary's was the capital of Maryland, and for a number of years the only town in the colony, it was never more than a small settlement. In 1694, after Maryland became a royal colony, the capital was moved to Annapolis, and Saint Mary's fell into decay.

Saint Mary's, a river connecting Lake Superior and Lake Huron. It receives the overflow of Superior and discharges its waters into Huron. A fall of 22 feet in the river, at Saulte Ste. Marie was an obstruction to navigation. Two canals have been made; one on the United States side of Saint Mary's Falls, and the other on the Canadian side. The United States canal was opened June 1855. This canal is now one and one half miles long, 100 feet wide at the bottom, and 20 feet deep. Hay Lake Channel, adjoining Saint Mary's River below the Falls, has shortened, by 11 miles, the passage from Huron to Superior. Navigation is closed by ice part of the year. The registered tonnage the first year through the United States canal was 106,296, and for 1900, 20,136,782. The canal on the Canadian side was opened in 1895. The river is spanned by the International Bridge at Saulte Ste Marie. There are a number of well-wooded islands in the river, all of which are favorite summer resorts.

Saint Mary's Church, Cavalry Engagement at. Gen. Sheridan, after his Trevilian raid, arrived at White House, on the Pamunkey, 21 June 1864. On the 22d the depot at White House was broken up, Grant having established a new base at City Point, and a train of 900 wagons set out, under cover of Sheridan, to

SAINT MARY'S COLLEGE — SAINT MICHAEL'S

cross the James River on the pontoon-bridge at Bermuda Hundred. It crossed the Chickahominy at Jones' bridge and moved to Charles City Court House *en route* past Malvern Hill, in advance of which were Wade Hampton's and Fitzhugh Lee's cavalry divisions that had kept close to Sheridan after the battle of Trevilian Station (q.v.), and were now hanging on his flank. Keeping Torbert's division with the trains, Sheridan sent Gen. Gregg, with his division and two batteries to Saint Mary's Church, to cover the exposed flank, and Gregg intrenched in a strong position. There was some skirmishing during the 24th, and late in the afternoon Hampton and Lee attacked Gregg on the right flank and in front, and after a stubborn contest forced him to give way, in some confusion, Sheridan says, but losing no material. Gregg, however, says that though the contest was unequal he retired without confusion or disorder; but he left his dead and wounded on the field. Hampton pursued to within $2\frac{1}{2}$ miles of Charles City Court House. The trains were moved back to Doutharts' Landing on the James and were ferried over, Sheridan following them across on the 26th. The Union loss as reported was 29 killed, 188 wounded, and 122 missing. The loss in Hampton's division was 6 killed and 59 wounded. Fitzhugh Lee's loss is not reported.

E. A. CARMAN.

Saint Mary's College, located at Saint Mary's, Marion County, Ky. It was founded in 1821 by the pastor of the Catholic settlement as Saint Mary's Seminary; in 1833 the Jesuits took exclusive control, and the name was changed to Saint Mary's College; in 1837 the college was legally incorporated. A college farm was conducted, and all students were required to work one day every week on the farm. In 1846 the Jesuits abandoned the control of the college, and in 1847 it was transferred to the charge of the secular clergy of the diocese of Louisville. Financial difficulties resulted in its being closed from 1869 to 1871, and in the latter year it was reopened under the charge of the Fathers of the Congregation of the Resurrection, a teaching order, and was later recognized as the official Roman Catholic college of the diocese of Louisville. The courses are divided into three departments, the commercial or English high school, the academic or classic high school, the classic or collegiate departments; the courses of the first two departments occupy three years, the course of the collegiate department, four years; the degree of A.B. is conferred on graduates of the collegiate department; A.M. is conferred for one year's graduate work. The library numbered 4,500 volumes in 1904, and is being steadily increased; the annual income in the year 1910 was \$30,000; the students numbered 130, and the faculty 12.

Saint Mary's Falls Canals. See SAULT SAINT-MARIE CANALS.

Saint Mary's Seminary, a Roman Catholic theological school in Baltimore, Md.; opened October 1794. From the first the seminary has been in charge of the Society of Saint Sulpice, an organization founded by Father Olier, in 1642, for the purpose of preparing young men for the priesthood. On the site of the present

institution, when the Fathers purchased the place, was the well known "One Mile Tavern." There were only five students in the school during the first three years, and in 1806 only 12 students. The superior-general of the Sulpicians had about decided to withdraw his professors, as they were much needed in other schools; but the entreaties of Bishop Carroll and the advice of Pope Pius VII. prevailed, and the school continued its work. For a time Saint Mary's College, Baltimore, now replaced by Loyola College (1852), and Mount Saint Mary's College, Emmitsburg, were affiliated with the seminary. The latter ceased to be a part of Saint Mary's Seminary, Baltimore, in 1826. Saint Mary's Seminary has the rank of a university, and power to confer degrees in the different departments of the sciences upon such of the students and clergy as satisfy the examination requirements. A student to obtain admission to the seminary must have a well-formed desire to study for the Roman Catholic priesthood, be recommended by his ecclesiastical superior, and for the first year philosophy, must have completed a full classical course, as shall be shown by examination. Students from other schools may be admitted to such courses as their examinations may entitle them. The main library contains about 35,000 volumes; special libraries are in the departments of theology and philosophy. There are well equipped reading and study rooms. Special attention is given to music, especially the Gregorian and Plain Chants. The members of the Association of Saint Camillus, which began in 1894-5 and was organized in 1898, visit hospitals and other institutions. In 1902-3 they had on their visiting list 15 institutions. In 1903 a scholarship was founded by Dr. Charles S. Grindall of Baltimore, for the benefit of "a native of the archdiocese of Baltimore studying for the missions of the same archdiocese." Attendance is not limited to any diocese or country. In 1910 there were in the seminary 122 students, 50 in the course of philosophy, and 72 in the course of theology.

Saint Maurice, Canada, a river in the province of Quebec, flowing into the Saint Lawrence at Three Rivers. Its course of 300 miles is marked by fine scenery, and waterfalls, one of which, 22 miles from its mouth, has a height of 160 feet.

Saint Michael (formerly REDOUBT SAINT MICHAEL), Alaska, a settlement on Saint Michael's Island, in the southern part of Norton Sound; lat. $63^{\circ} 28' N.$; lon. $162^{\circ} 5' W.$ The settlement, or trading post, was founded in 1833 by Tebenkoff. The island is low and volcanic and is covered with vegetation. Saint Michael is the port where ocean steamers transfer and receive freight which is carried up and down the Yukon. The river vessels pass through the Aphoon Channel, behind a bar, and enter the Yukon by its northern passage. Navigation opens in June and closes in September. Since the discovery of gold, Saint Michael has become most important. During the summer there is a population of between 3,000 and 4,000. Many of the permanent residents are Eskimos. Pop. about 1,000.

Saint Michael's, or São Miguel. See AZORES.

SAINT MICHAEL'S MOUNT — SAINT OURS

Saint Michael's Mount, England, in Cornwall, three miles east of Penzance, is an isolated rock of conical form, about 195 feet high. An ancient and picturesque castle stands upon its summit, from whose tower projects the stone lantern called "Michael's Chair." A causeway connects the island with the shore. A fishing village with a projecting harbor nestles at its base. The hill is a geological curiosity, being a vast mass of granite protruding through schistous rocks. In remote times Edward the Confessor founded upon it a Benedictine priory, which at the time of the Conquest was annexed to the abbey of Mont Saint Michel (q.v.) in Normandy. Its possession was disputed during the Lancastrian and Parliamentary wars. After a considerable period it passed from the monks into secular possession, becoming a manorial residence, and in 1660, the property of the St. Aubyns.

Saint-Michel, sǎn mē-shēl, Mont, France.
See MONT-SAINT-MICHEL.

Saint Nazaire, sǎn nā-zār, France, a seaport town in the department of Loire-Inférieure, near the mouth of the Loire and 37 miles west of Nantes by rail. Great improvements have been carried out in the port. The town is the terminus of the General Transatlantic Company, and the ship-building yards of this company and that of the Loire employ 2,500 men. Extensive forges employ 1,600 men in the manufacture of steel rails, sheet and bar iron, etc. The town is of recent growth and these industrial works form its chief buildings. Of peculiar interest in the vicinity is an ancient granite dolmen, 10 feet long and 5 wide, resting horizontally on two stones, which extend about seven feet above the surface of the ground. It is believed that Saint Nazaire occupies the site of the ancient maritime town of Corbilo, in whose harbor the Roman fleet was built (56 A.C.) with which Brutus routed the Venetian insurgents. Pop. about 38,000.

Saint Nicolas, sǎn nē-kō-lā, Belgium, in the district of Dendermonde, in East Flanders, 12 miles by rail southwest of Antwerp, occupies a central position in the densely populated region of Waes. The most important buildings are the town-hall and churches. It is an agricultural and manufacturing centre and has a large flax market and manufactures of cotton, wool, lace, needles, bricks and pottery. There is considerable trade in linens, flax, corn, etc. It is celebrated as the place where Philip the Fair in 1497 swore to maintain the privileges of Waesland, of which Saint Nicolas was the capital. Pop. about 32,000.

Saint Olaf College, located at Northfield, Minn. It was founded by the pastor of the Norwegian Lutheran congregation of Goodhue County in 1874; until the year 1886 it had only an Academic (secondary) Department; from 1886 to 1890 it gradually developed into a college, and in 1890 was officially placed under the control of the United Norwegian Lutheran Church. Though this official connection was severed for a time in 1893, the college continued to be closely affiliated with the denomination, and in 1899 the official relation was re-established. In 1900, the college department of the United Church Seminary was united with Saint Olaf College.

The organization of the college includes two departments: the Academic Department and the Collegiate Department. The Collegiate Department offers two courses, classical and scientific, leading to the degrees of A.B. and B.S.; a few electives are offered in the Junior and Senior years. The Academic Department has three courses, the classical and scientific, especially designed to prepare students for the corresponding collegiate courses, and the English course; the latter includes instruction in bookkeeping, commercial law, and domestic economy. Biblical or church history forms a part of the curriculum in both departments; and there is a musical department providing courses in piano and voice culture. The Steensland Library Building was completed in 1902 and contains the museum and a library of 8,000 volumes (1910). The annual income in 1910 amounted to \$48,000, the students numbered 468, and the faculty 30.

Saint Omer, sǎn-tō-mār, France, a fortified city in the department Pas-de-Calais, 26 miles southeast of Calais, on the Aa. It is situated on a marshy site, has two harbors, and begins the canalized portion of the Aa. The Gothic cathedral is old and curious. It has fine portals (13th-14th centuries), good paintings, interesting statues and monuments, wood carvings, and fine stained glass, and mosaics. The other notable points of interest are the ruined tower and arches of the Benedictine Abbey of Saint Bertin, an arsenal, a museum, and a library. Saint Sepulchre is remarkable for its beautiful stone spire and stained-glass windows. The town-hall contains valuable records, a picture gallery and a theatre. There is a large public library, and extensive arsenal. Saint Omer manufactures tobacco pipes, cloth, hosiery, tulle, cambric and muslin embroideries. Its trade is in these articles and in paper, flour, sugar, beer and other liquors. The town has often suffered from attack and invasion by French, Flemish, and Spaniards.

Saint Ouen, sǎn-too-ōh, France, in the department of the Seine, about one mile southwest of Saint Denis, is an important manufacturing centre, and river-port, with spacious docks. The industrial establishments include foundries, forges, machine and glass works, sugar and saw-mills, and manufactories of rubber-goods, varnish, printer's ink, canned foods, and firearms. Pop. about 39,000.

Saint Ours, Jean Baptiste de, SIEUR D'ESCHAILLONS, French-Canadian soldier: b. Canada 1668; d. Montreal 1747. His father, Pierre de Saint Ours, was the first of the family to come to Canada, and obtained extensive grants of land. The son entered the army at an early age and in 1702 was made lieutenant. He was one of the commanders of the expedition against Fort Orange (Albany) in 1708. He commanded a company in De Ramezay's expedition against the English in 1710, and in 1721 was sent on a special mission to several Indian tribes by the governor, De Vaudreuil. On this expedition Saint Ours endeavored to put a stop to the liquor traffic with the Miamis, and tried to bring about peace between the Sioux and their enemies; also induced the Creeks to form a single village. On his return he subsequently became king's lieutenant of Montreal.

SAINT PATRICK'S COLLEGE — SAINT PAUL

Saint Patrick's College, a theological school in Maynooth, Ireland. It was founded in 1785 and endowed, the only Roman Catholic institution in Ireland which received a government endowment. Several attempts were made to repeal the act granting this aid, and in 1869 the opponents in parliament were successful. The College received, in lieu of its annual income, a capital sum equal to 14 times its annual endowment. The college is now affiliated with the Catholic University of Ireland. It has a large faculty, well equipped library, laboratory, and study rooms. There are from 500 to 600 students in attendance each year. A large number of the students, who have been ordained priests, have been sent to all parts of the world, especially to North and South America; and have filled all ecclesiastical positions from the missionary among savages to that of archbishop.

Saint Paul, the Apostle to the Gentiles. According to Acts xxi. 39 Paul was a native of Tarsus, the most important city of Cilicia. His parents were of pure Jewish descent, for he could boast that he was "of the stock of Israel, of the tribe of Benjamin, a Hebrew of the Hebrews" (Phil. iii. 5). His father, however, was a Roman citizen. How he had acquired this privilege we are not told. It may have been purchased or obtained in some other way. Paul was content to say that *he* was freeborn. Tarsus was a centre of Greek culture and the son of a citizen of that town had ample opportunities to secure the best classical education the times afforded. To what extent Paul shared these advantages is not stated, but his words (Acts xxii. 3) appear to mean that at a comparatively early age he was sent to Jerusalem to receive a *Jewish* rather than a Greek education. The social status of Paul's parents may have been high. There are good reasons for thinking that the family was wealthy (see Ramsay, 'St. Paul the Traveller,' etc., pp. 310 ff). However, this did not interfere with the good Jewish custom of teaching the boy a trade. That he learned to make tents was the more natural since the wool of the long-haired Cilician goats was extensively used for tent-cloth. It is probable that he learned his handicraft before he went to Jerusalem for his education.

Like others with two names mentioned in the New Testament he was more familiarly known in Jewish circles by his Hebrew name *Saul*. Paul was his Roman name, the cognomen given him probably by his father, for what reason we do not know. As his life work developed and he felt himself called to minister to the great Gentile world he preferred his Roman-Greek name to the Hebrew one.

The date of Paul's birth cannot be fixed with exactness. In his letter to Philemon (v. ix.), written probably about 60 A.D., he calls himself an elderly man (πρεσβύτερος). This may be taken as signifying, approximately, one who has attained his sixtieth year. Probably he was born within a very few years of the beginning of the Christian era.

His personal appearance was not imposing. His opponents could easily admit that his letters were powerful and at the same time remark that "his bodily presence was weak and his speech contemptible" (2 Cor. x. 10). A very ancient tradition in Asia Minor speaks of him as "bald-

headed, bow-legged, strongly built, a man small in size, with meeting eyebrows, with a rather large nose, full of grace, for at times he looked like a man and at times he had the face of an angel" (see Ramsay, 'The Church and the Roman Empire,' ch. xvi.). Behind such an unattractive exterior lay a physical nature capable of enduring the severest strains (see 2 Cor. xi. 23-28) and a soul endowed with most varied gifts in rich abundance.

To the young Jew of Tarsus the opportunity to study in Jerusalem at the feet of Gamaliel (Acts xxii. 3), one of the most learned rabbis of his day, was a privilege to be used to the utmost, no mere parent-imposed task. Proud of his Pharisaic ancestry and training the young man eagerly pursued his studies "advancing in Judaism beyond many" of his associates, "being more exceedingly zealous for the traditions" (Gal. i. 14). He studied the Old Testament and especially the Law not merely as the authorities for the national religion or for orthodox Pharisaic theology, but as the foundation and source of his personal religion. His religion was his life. He studied to satisfy the hunger of his soul for perfection. His one endeavor was to live the blameless life the law required. So far as externals went he succeeded in doing this (Phil. iii. 6). But the more thoroughly he probed his religious experience to the depths the more hopeless his case seemed to him. The sentence of the law became to his sensitive conscience the sentence of death (Rom. vii. 7-25).

It was while Paul was thus pursuing his studies in the rabbinic schools that Jesus the Messiah lived and died. Whether Paul was in Jerusalem on any of the occasions when Jesus visited the place, or whether he ever saw Jesus in the flesh is doubtful. (2 Cor. v. 16 does not necessarily imply this.) However that may have been, Paul's opposition to Christianity did not begin with the first Christian preaching. Not until the early Church had become well started, when such a teacher as Stephen began to declare the merely temporal character of Jewish ordinances, was Paul's opposition aroused. We meet him first in the record of the martyrdom of Stephen at which the witnesses laid down their garments (Acts vii. 58, see Deut. xvii. 7) "at the feet of a young man named Saul, "who was consenting to his death" (Acts vii. 58, viii. 1). Though too young to have been a member of the Sanhedrin (Acts xxvi. 10 does not mean this) he stood high in the favor of the Jewish authorities and was only too willing to take the lead in a general persecution of all Christians in Palestine and adjacent lands. After having caused the imprisonment of many in and about Jerusalem, numbers of whom were put to death, while others suffered great indignities (see Acts xxvi. 10-11, xxii. 19, ix. 1, Gal. i. 23), he secured authority from the chief priests to proceed to Damascus and take action against any Christians he might find there (Acts ix. 1, xxii. 5, xxvi. 12).

But Paul was not to enter Damascus as a persecutor. As he and his party neared the city a sudden and most profound transformation took place. Paul had a vision, to him brighter than the noonday sun, in which he saw Jesus the Nazarene and heard Him ask "Saul, Saul, why persecutest thou me?" (see the three accounts in Acts, ch. ix., xxii., and xxvi., and

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also Gal. i. 15, 1 Cor. ix. 1, xv. 8). It was enough. Henceforth Paul's entire point of view was changed. God had "revealed His Son" in him. He had seen Jesus as *Lord*. It meant parting with all his past, though as yet he saw this only as to some main points. Above all, it revolutionized his idea of Jesus. That one had been to him only the justly crucified leader of a heretical movement. He was now and evermore the glorified Messiah. Helpless, blinded, and weak he was led into the city. Shortly after, he was visited by a Christian disciple in Damascus named Ananias who comforted him with sympathetic words, baptized him and thus recognized him as a Christian brother. Paul soon began to proclaim Jesus as the Messiah to the Jews of Damascus. This only aroused their hostility and they plotted to get him in their possession. He succeeded in escaping by being let down through the wall in a basket (Acts ix. 25, 2 Cor. xi. 32). Avoiding the Arabian guard he made his way into Arabia (Gal. i. 17) where he stayed for upward of three years, not "conversing with flesh and blood," that is, not seeking light or instruction from those who had been Christians before him, but in meditation and communion with God, seeking to sound the depths of that great revelation that had overtaken him on the way to Damascus. What struggles and conflicts he then went through, what changes of view on many details of his Jewish belief, what great revolutions of opinion, what new found hopes and convictions he now experienced—we can see all these reflected in his later speeches and letters. Finally he was able to outline the main points involved in his new faith. That Jesus of Nazareth was and is the Son of God, that in His death forgiveness of sin is made possible, and that through faith in Him forgiveness and salvation are made a personal possession,—these formed the core of his gospel of the cross, a gospel that no man taught him, but which came to him from God (Gal. i. 11).

He was now ready to learn details about Jesus' earthly life and ministry. He therefore returned to Damascus and then visited Jerusalem especially to talk with Peter, the leading apostle (Gal. i. 18-19). According to Acts ix. 27 it was Barnabas who introduced him to the Apostles (only Peter and James, however, according to Gal. i. 18f.). Having gained what he desired from Peter and by his preaching aroused the opposition of his former associates in Judaism he soon left Jerusalem and went into "Syria and Cilicia" (Gal. i. 21; see Acts ix. 30). After some years' labor in these regions, in connection with which we may well suppose that he sought to convert members of his family to the new faith, he was sought out by Barnabas and persuaded to join that good man in the work of building up the new church at Antioch, the metropolis of Syria. This church had almost from the first considered Gentiles as worthy to be approached directly with the Gospel message. In such an atmosphere Paul's own view of the Gospel as suited for man as man independent of his antecedents found room for full expression. After laboring here for a year Paul, with Barnabas, was delegated to carry an offering from the church at Antioch to the mother church at Jerusalem (Acts xi. 27-30, xii. 25). Since

Paul makes no mention of this visit in his survey of his connection with the mother church in Galatians i. and ii. it is probable that it was of no special importance to Paul personally. Returning to Antioch accompanied by John Mark of Jerusalem, Barnabas' cousin, it was soon decided to organize a mission to the adjacent lands. At a meeting of the church Barnabas and Paul were formally set apart through prayer and laying on of hands to this work (Acts xiii. 1-3).

Taking with them John Mark as assistant, the two set out on the First Missionary Journey (Acts xiii. 4-xiv. 28). Cyprus was first visited and traversed from end to end, then crossing the sea to the mainland they disembarked at Perga of Pamphylia. Here they decided to strike inland. For some reason Mark deserted them now and returned to Jerusalem. From Perga they proceeded to Antioch of Pisidia. At this important centre of trade the missionaries stopped. Paul delivered an address in the Jewish synagogue in which he sought to convince them that the Jesus who had been crucified by the rulers in Jerusalem was indeed the Messiah promised in the Scriptures. So great was the interest aroused that a second address was asked for the following Sabbath. At this meeting the majority in the synagogue refused to accept the message and the missionaries then turned their attention to the Gentiles. With such Jews as chose to leave the synagogue they organized a church in which naturally Gentiles and Jews met on equal terms. The work grew rapidly but the opposition of the Jews of the synagogue became so bitter that Paul and Barnabas thought it best to leave. From Antioch they proceeded eastward to Iconium, where they met with much the same experience, except that here the anger of the Jews led to plots against the lives of the missionaries. From Iconium they went on to Lystra and thence to Derbe. At Lystra, the home of the future disciple Timothy, the healing of a cripple led the pagan multitude to think that the gods were again visiting the earth. All these towns were on the great commercial highway leading through southern Asia Minor from Asia to Europe. Though originally belonging to different nations they were then all included in the great province of Galatia and therefore it is most natural to see in the churches founded on this journey the Galatian churches to whom the apostle addressed the Epistle to the Galatians. From Derbe the missionaries retraced their steps and arriving at the coast sailed directly to Antioch without revisiting Cyprus. The journey had been a complete success. It proved how the Gospel was capable of being applied to and understood by the pagan world. The church of Antioch, doubtless, rejoiced greatly at the recital of their experiences, and the way seemed open for larger efforts along the same line.

Just at this time extremely conservative Jewish Christians from Jerusalem disturbed the peace of the Antioch church by teaching, as the orthodox view, that Gentiles, in order to be saved, must not only profess faith in Jesus Christ and be baptized, but also be circumcised and obligate themselves to keep the Jewish law.

What part Paul took in the discussion at Antioch we do not know, but so serious was

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the situation seen to be that the church decided to refer the matter to the apostolic body at Jerusalem and delegated Barnabas and Paul to represent them at the council so summoned.

The probable date of the Apostolic Council was 49 A.D. If Paul counts the "fourteen years" of Gal. ii. 1 from his conversion, then that event took place somewhere near 35 A.D. If the fourteen years is to be counted from his visit to Jerusalem to see Peter (Gal. i. 18) then his conversion must have been as early as about 32-33 A.D. Either date is equally probable. The First Missionary Journey probably covered about a year and a half (that is, spring of 47 to fall of 48 A.D.) The doings of the council are reported in Acts xv. which needs to be supplemented by Paul's own statements in Gal. ii. 1-10. The result was a victory for Paul at least to this extent, the mother church put itself on record as recognizing the legitimacy of the Gentile Christian movement and refused to order that Gentile Christians should be circumcised. Paul himself also was given the right hand of fellowship by the "pillar Apostles" and his mission to the Gentiles recognized as divinely appointed.

It was only natural then, that, on their return to Antioch, Paul should propose to Barnabas that they revisit their churches in Galatia. Barnabas was willing but wished to take Mark. Paul would not consent to this. He could not overlook the fact that Mark had deserted them on the first journey. The contention was sharp and the two friends separated. Paul now set out with Silas (Silvanus) as his companion on his second missionary journey (Acts xv. 40-xviii. 22, fall of 49 A.D. to summer of 52). From Antioch they visited Syria and Cilicia and then entered Asia Minor through the Cilician Gates. In due time they arrived at Derbe and Lystra. Here they were joined by Timothy, a choice young convert. After spending some time with the churches organized on the first journey they moved on through Asia Minor, without finding an opening, until they arrived at Troas, where, possibly, Paul met Luke. The "we" sections of Acts begin at this point (Acts xvi. 10). Here the night vision of a Macedonian man calling for help convinced Paul that the Gospel must be carried into Europe. Crossing over to Macedonia, at Philippi, at Thessalonica and at Berea, all Macedonian towns, Paul succeeded in organizing churches. His method was essentially the same in all cases,—to first address the Jewish inhabitants at their synagogue or other meetings, and then, when hostility manifested itself, to withdraw his adherents from the synagogue and organize a church of the free Gentile Christian order. The discontented Jewish element followed him with dangerous persecution and it was to avoid falling into their hands that he left Berea hastily and went on to Athens. Here there was apparently no synagogue and an uninviting field. The city of philosophers and idlers was not thirsting for the Gospel of Paul. But even here Paul's earnestness got the better of him and in spite of misgivings he delivered his famous address on Mars Hill. Perhaps nowhere does Paul's versatility and breadth of view, his profound conception of the universal character of the Gospel message show itself as it does here in this address. But Athens was not prepared for such a message and as soon as his

helpers arrived from Macedonia with the report of the conditions there he sent Timothy back to Thessalonica (1 Thess. iii. 1), while he himself (with Silas, see Acts xvii. 15 and xviii. 5) pushed on to Corinth. Here, at first, he was in a discouraged mood. His first preaching in the synagogue seems to have produced little effect. Making the acquaintance of Aquila and Priscilla, Jews lately banished from Rome, he joined them in working at the tent-maker's trade. But the arrival of Timothy from Macedonia with news of the devotion and constancy of the disciples there stirred him to new efforts. His vigorous preaching in the synagogue now led as usual to a division and the withdrawal of many, including Titus Justus, ruler of the synagogue, to form a Christian church. For a year and a half Paul was busy at Corinth. To organize and build up a Christian community in that large, gay, wicked commercial metropolis was no easy task. It was while here that he wrote his two letters to the church of Thessalonica. The first one was occasioned by Timothy's arrival with good news and is full of words of commendation and hope. The second was written to counteract certain wrong views or inferences, mainly of statements in the first letter. These epistles, perhaps the earliest of the New Testament books, show us the Apostle's mind before the great doctrinal conflicts of the next few years had engaged his attention (see works on New Testament theology, such as those by Weiss, or Beyschlag, or Sabatier's 'The Apostle Paul'). The long stay in Corinth was perhaps shortened by the unsuccessful attempt of the Jews to have him tried by Gallio, the Roman proconsul. Though this came to nothing Paul seems to have left Corinth soon after and crossing over to Ephesus with Aquila and Priscilla he hastened on to Antioch (Acts xviii. 18-22).

It was, possibly, on this occasion that Paul felt called upon to rebuke Peter for his inconsistent conduct in withdrawing from open fellowship with Gentile Christians (Gal. ii. 11 ff.).

His stay in Antioch was not a long one. He soon found himself on his Third Missionary Journey (Acts xviii. 23-xxi. 17, fall of 52 to spring of 56 A.D.) Rapidly going through his old field in Galatia he arrived at Ephesus, then the great commercial emporium of Asia Minor. Here for nearly three years he made his headquarters. For Paul this was a period of most intense activity. Ephesus was a meeting place for all sorts of philosophical and religious speculations. As the patron city of the worship of the great goddess Artemis (Diana) whose temple outside the city walls was one of the wonders of the world, it was a stronghold of paganism and superstition. It was an open door, "but there were many adversaries" (1 Cor. xvi. 9). But it was not alone in Ephesus that "adversaries" were opposing the Apostle. In his old churches in Galatia and in Corinth enemies were sowing seeds of discord. The mischief-makers were members of the extreme Judaistic party, whose opposition to Paul's Gentile Christianity had necessitated the council at Jerusalem in 49 A.D. Only apparently defeated there they determined to carry the conflict into the churches founded by Paul himself. Their arguments were, mainly, that Paul was only a secondary

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apostle, not one of the original twelve, that his gospel was therefore only one derived by false reasoning from the normal gospel of Judaistic Christianity, and that Paul's principles practically made the whole Old Testament, especially the Law, of no character or value whatsoever. Only too many in Paul's own churches were ready to listen to such teaching. From Galatia and from Corinth there came news to Ephesus of factious strife, of the adoption of Jewish customs and of growing hostility to himself on the part of those he had taught and trusted. But Paul, though bitterly disappointed and sorely tried, was equal to the emergency. It was in such a furnace of affliction the Epistles to the Galatians and Corinthians were forged. In these he successfully met the points raised by his assailants and, at least in the case of the church of Corinth, succeeded in winning the church back to himself. For the details of these matters readers are referred to special articles on these Epistles. During his sojourn at Ephesus "all Asia" (see Acts xix. 10) had the advantage of Paul's missionary activity. Not long after the tumult caused by Demetrius the silversmith (xix. 23-41) he set out for Corinth, but, uncertain of the reception accorded to his first letter (1 Corinthians) and subsequent messages, he took the indirect route via Troas and Macedonia. In Macedonia Titus came from Corinth with most encouraging news (2 Cor. vii. 5-7) and Paul gladly pushed on to revisit the Corinthian church. He stayed at Corinth during the winter of 55-56 A.D. Before leaving Greece for his long contemplated visit to Jerusalem he penned his most comprehensive and important epistle, to the Christians of Rome, in which he set forth the great fundamentals of the Christian theology and thus prepared them for the visit he had in mind to make them. (See ROMANS.) Paul now hastened to Jerusalem, not stopping at Ephesus, but saying farewell to a delegation from that church that met him at Miletus.

At Jerusalem he presented the mother church with the great collection he had been gathering for some time and was cordially received by James and other leading members, but advised to give evidence to the Jewish Christians that he himself still followed the ancestral mode of life according to the Law (Acts xxi.). Paul was willing to do this, but it brought him into conflict with certain fanatics who accused him of defiling the temple. These were not Jewish Christians, but Jews of Asia who knew of his work in Ephesus and were bitterly opposed to him. A great uproar followed in which Paul was nearly killed, and only rescued by the prompt action of the Roman captain who commanded the garrison of the Castle of Antonia overlooking the temple. Paul's attempt to explain his position to the Jews only enraged them the more and soon after, convinced that plots were being laid against Paul, Lysias the Roman captain sent him under a strong guard to Felix the governor of Palestine at Cæsarea. Felix soon discovered that his prisoner was not guilty of any serious offense, but kept him bound in easy confinement, partly from mercenary motives, until his recall about two years later (that is, about 58 A.D.). Felix was succeeded by Porcius Festus before whom Paul was examined and given opportunity

to be tried at Jerusalem. Paul, however, declined and cut the whole matter short by appealing to the emperor. Soon after Festus permitted Paul to state his case before Herod Agrippa II. and other Jewish worthies, hoping thereby to understand it more clearly (Acts xxv.-xxvi.).

Paul was sent to Rome at the first opportunity. With other prisoners under a strong military guard they embarked at Cæsarea, changed ships at Myra, experienced shipwreck, were stranded at Malta, and compelled to remain there all winter. In the spring the voyage was resumed and in due time they arrived at Rome. Paul's resolution and courage had commended him to the centurion in charge during the voyage, and he was in consequence treated leniently. Friends met them some miles outside of Rome. In the city, while awaiting the emperor's pleasure concerning his case Paul was permitted to live in his own hired lodging and have free intercourse with any who might desire to see him. One of his first acts in Rome was to call the leading Jews of the city together and set before them the principle of Christianity. The result was, as usual, that some believed him; others did not. Luke says (Acts xxviii. 30-31) that this Roman captivity lasted two years. If it had ended with his execution it would probably have been so stated. The natural inference is that he was released at the end of that period. It was during his Roman imprisonment that he wrote the 'Epistles of the Captivity,' that is Ephesians, Colossians, Philemon, and, probably as the last, Philippians. In these epistles the controversies that raged in Asia and filled his mind when writing to the Galatians and Corinthians are no longer prominent. His mind is full of the thought of the church of Christ, and of the great divine personality who is its head. It is in these beautiful epistles, especially in Philemon and Philippians, that the heart of Paul is seen as nowhere else except perhaps in 2 Corinthians. Some details as to Paul's experience in Rome may be gathered from Philemon and Philippians, not sufficient however to make a complete picture.

After his release (61 A.D.) Paul appears to have undertaken another missionary journey, possibly to Spain (see Rom. xv. 24, also the tradition in Clem. Rom.). He afterward revisited the East and while there (according to what seems the most probable theory) wrote 1 Timothy and Titus. Again arrested he was brought to Rome for a second trial. Before this took place he wrote a letter to Timothy (2 Timothy) beseeching him to come to him as soon as possible. It was probably about 64 or 65 that the great Apostle was executed by command of Nero. (The points in this paragraph have been stated on the theory that the Pastoral Epistles are genuine Pauline letters.)

It is hard to estimate adequately the significance of such a life. More than any other one Paul made Christianity the world-religion. No other man has so profoundly influenced the religious thinking of mankind. He was the greatest man of the Apostolic Age, if not of all ages of the Church. Yet he was ever the disciple and Jesus the Master. Jesus was greater than Paul.

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Saint Paul, a remarkable island in the Indian Ocean, half way between Africa and Australia, and about 50 miles south of the island of New Amsterdam. These islands are the exact antithesis of one another, Saint Paul almost barren, and New Amsterdam covered with a dense vegetation. The island is two miles long, 860 feet high and of volcanic origin. Goats, cats, rats and mice flourish, insect life is abundant and sea-fowl in multitudes are characteristic. Fisheries are excellent. Saint Paul was ceded by England to France in 1892.

Saint Paul, the capital of Minnesota, county-seat of Ramsey County, and ranking 23d in population among the cities of the United States; situated on the Mississippi River at what is practically the head of navigation, 2,200 miles from its mouth; by the shortest railroad routes 1,299 miles from New Orleans, 410 miles from Chicago, 1,341 miles from New York, and 1,823 miles from Seattle. It is picturesquely built on a series of benches or terraces of irregular breadth and varying height, the highest land being 266 feet above the level of the river; all the irregularities merging at last in an elevated, rolling plateau. The splendid drainage thus afforded is supplemented, in a portion of the city's area, by a curious provision of nature; the hard upper limestone rock resting at a convenient depth on a sandstone so soft that it is easily worked with pick and shovel, but which hardens on exposure to air. Advantage has been taken of this in tunneling sewers, subways and conduits for water pipes, electric light, telephone and telegraph wires. Add to perfect drainage a cool, dry atmosphere, an ideal water supply—drawn from a series of crystal lakes not far away, fed by ice-cold natural springs and artesian wells, while their entire watershed is protected from nuisances by the ownership and control of the water-board—and we have the main secrets of the winning by Saint Paul, at the Paris Exposition in 1900, of the medal awarded to "the healthiest city in the world." The annual death-rate in 1901 was 9.51; total (1909) 2,416. Due credit should be given for this showing to an excellent administration of its health department, as well as to the natural advantages mentioned. The city occupies an area of 55 square miles, mainly on the left or east bank of the river; connection being made with the portion on the west bank by means of three public bridges and several used by railroads exclusively. Beside these, the irregular character of the site and the general avoidance of grade crossings necessitates the maintenance of 57 other bridges spanning railways, valleys, etc. There are 452 miles of improved streets. With the exception of a few squares where hard brick is used, and some steep inclines, all the business streets are paved with asphalt, as are a large number in the residence districts. The residence streets are beautifully laid out, generally with side lawns and shaded with trees; while the houses are usually set back and apart from one another, so as to allow of wide front lawns and grassy spaces. Summit Avenue, the most fashionable residence street, winding for a portion of its length along the edge of the bluff, and affording fine views of the river gorge and the lower terraces of the city site, is the admiration of all visitors.

Chief Buildings.—Dominating the view, as

the city is approached from the south and east, is seen the new State Capitol of Minnesota, a magnificent structure of white Georgia marble, standing on high ground to the north of the business section; erected at a cost of \$4,500,000, and comparing favorably in elegance and solidity with any public building on the continent. The contour of its lofty dome is especially admired. The new United States building, an expensive structure of pinkish-gray stone, with an imposing tower, shelters the post-office, the customs and internal revenue offices and the United States courts. The old United States building, of limestone, is still attractive in its gothic lines. The City Hall and County Court-house is another fine gothic structure of stone, surmounted by a tower in which is a musical chime of bells, and surrounded by green lawns. It cost, exclusive of the donated site, \$1,000,000. Near the court-house is a handsome modern stone jail. The towering office-buildings of the Pioneer Press Company, the New York Life and the Germania Insurance Companies, the Endicott Arcade, the Manhattan building and the building of the German-American bank afford unsurpassed office accommodations. The old State Capitol building of brick, with four wings surrounding a high square central tower, is an interesting landmark. The City and County Hospital, near the river, is a model institution in architecture, equipment and management. Some of the department store buildings are of immense size. Among the church edifices, the People's Church, with an auditorium capable of seating about 2,500 persons; the Central Presbyterian, the Park Congregational, the First Baptist and the old Cathedral are the most noticeable.

Municipal Service.—The street cleaning and sprinkling services are managed by the municipality; likewise the collection of garbage; the appropriation for street-clearing one year was \$150,000; for sprinkling, \$40,000; for garbage collection, \$25,000. A hydraulic apparatus is used in flushing the asphalt pavements. The sewage is discharged into the river through 185 miles of mains; 21 miles of which are tunneled through the sand-rock. There is a fine electric street railway service, including 15 lines, with a total length of 123 miles. It is operated in connection with the Minneapolis lines, largely by means of water-power electrically transmitted from dams in the Mississippi. This has recently been supplemented for street railway and other purposes by additional power brought from the Apple River, Wis. Enough more is expected to be derived from the government dams built about a decade ago for the installation of slack-water navigation on the Mississippi between Saint Paul and Minneapolis, to light all the streets and public buildings by electricity. The latter illuminant is already extensively used in the business districts, but the rest of the city is mainly lighted by gas. A large portion of the telephone, telegraph and other wires have already been transferred to underground conduits, and the work is being continued with a view to freeing the streets entirely of poles and overhead wires. The fire department has an equipment valued at about \$600,000, including 16 steam fire engines, four chemical engines, a water-tower and other modern appliances. The police department employs 200 men, and its

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work is facilitated by an alarm system with 105 signal boxes, telephones, patrol wagons, etc.

Parks, Boulevards and Public Resorts.—The topography of the city has afforded great opportunities for the laying out of picturesque parks and parkways; and a public-spirited park commission has achieved some notable successes through the expenditure of the means liberally placed at its disposal. The total area of the parks is 1,082.4 acres. Como, Phalen and Indian Mounds parks are the most popular; the first two including beautiful lakes; the last affording what is said to be the most magnificent view on the Mississippi River. Merging with its grounds are those of the State Fish Hatchery. Harriet Island, in the river fronting the business part of the city, has also been made an attractive pleasure ground. Here are located the public baths, with accommodations, for both sexes, on a large scale, not only for bathing but for refreshments; all, with the grounds, being under the control of the health commissioner. The park driveways reach a total of 18 miles; the boulevard drives, $3\frac{1}{4}$ miles. The River Boulevard, only the first picturesque stretches of which are included in the above figures, will, when completed, add many miles to a drive of unsurpassed attractiveness. The Fort Snelling military reservation—a large area at the junction of the Minnesota and Mississippi rivers, adjoining the city on the southwest and connected by a bridge spanning a romantic gorge—is practically a part of Saint Paul's park system. It is one of the most important military posts in the Union.

Fair Grounds.—On the north, surrounded by Saint Paul territory on three sides, but legally not a part of the municipality, are the grounds and beautiful buildings of the Minnesota Agricultural Society, owned by the State. Here is annually held a fair unequalled in the variety of its exhibits and the size of the attending crowds by any "state fair" in the United States; the only local fair surpassing it being that annually held by a private corporation at Saint Louis. The attendance during the six days of the fair in 1903 numbered 240,601 persons.

Schools and Libraries.—The public schools are housed in 55 buildings, most of them of an advanced type. There are four high schools. The enrolment of pupils is about 25,000 annually; the amount paid for teachers' salaries, about \$500,000. There are also about 60 private and parochial schools, with an estimated attendance of 15,000; also 11 denominational colleges. The city shares with Minneapolis the advantages of the University of the State of Minnesota; the Agricultural School of that institution being in Saint Paul, and its other buildings near the line dividing the two cities. Operated in connection with the School of Agriculture is the State Experiment Station. This makes the course so thoroughly practical and advantageous that the school has a national reputation, and yearly attracts numbers of students from abroad; being open on equal terms to applicants from any part of the Union. The Public Library, owned and supported by the municipality, is housed in what was formerly the City Hall and Market building. It contains about 60,000 volumes, and the expense of its maintenance and enlargement is about \$37,500 per

year. In the Capitol building are located the Law Library of the State, about 20,000 volumes, and that of the Minnesota Historical Society, 63,000 volumes. There are also seven or eight semi-public libraries, under society management. In the home of President J. J. Hill is the finest gallery of paintings of the Barbizon School on the American continent.

Churches and Charities.—Of the 164 churches and mission stations in the city, 2 are Adventist, 14 Baptist, 24 Catholic, 2 Christian or Disciples, 15 Congregational, 16 Episcopalian, 6 Evangelist, 7 Hebrew, 31 Lutheran, 20 Methodist, 1 People's, 18 Presbyterian, 1 Swedenborgian, 1 Unitarian, 2 Universalist, 2 Salvation Army, 2 Spiritualist, 2 Christian Science. The poor of Saint Paul are exceptionally well cared for, through a public board of control, a well organized relief association, several orphan asylums under denominational control, a Children's Home, where all friendless waifs are cared for until private homes are found for them, a fine public hospital and several other hospitals which care for a limited number of free patients. In addition to all these instrumentalities, by the wills of Mrs. Cornelia Day Appleby and other heirs of the estate of Amherst H. Wilder, about \$2,000,000 have been placed in the hands of trustees, the annual income of which is to be devoted to the assistance of the poor of Saint Paul.

Transportation Facilities.—Saint Paul is the railway centre of the entire Northwest. Eleven trunk lines either begin or terminate here, with a mileage of more than 36,000 miles. With two exceptions, their general offices are located here, mostly in their own buildings; many of them also maintaining extensive car-shops. There are seven lines to Chicago and the East; three to Lake Superior, five to Manitoba and the Northwest, four to the Pacific Coast, three to the Southwest; and five to the South. The "Minnesota Transfer," a sort of clearing-house for the traffic entering the Twin Cities, occupies extensive grounds in the northwest quarter of the city. Steamboats, once the only vehicles of commerce with the South and East, still carry on some freight traffic; and in summer the river is a favorite route for pleasure travel.

Commerce and Manufactures.—Saint Paul is a port of entry and one of the few tea-inspection ports of the United States; a large portion of the teas imported from the Orient being here inspected. The total amount of dutiable goods passing through the custom-house already reaches \$4,000,000 a year; of goods free of duty, \$750,000. The customs collections during the fiscal year ending 30 June amounts to about \$880,000; the internal revenue collections, to \$1,500,000. From Saint Paul's peculiar connections with the Canadian railways through the "Soo" line, which affords a competitive route to tide-water both on the Pacific and on the Atlantic, practically outside of American regulation, its merchants are able to compete on even terms with those of Chicago in wholesaling nearly all kinds of goods, imported and domestic. Hence the wholesale traffic of the city has grown to remarkable dimensions, reaching all over the continent. The "wholesale district" is a prominent feature of the business area. The total business done by the wholesale houses in one year exceeded \$250,000,000. The peculiar

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railway facilities here available have recently attracted much manufacturing enterprise. There are 650 manufacturing plants, employing 25,000 persons, with an output for the last year of over \$125,000,000. By a co-operative movement among the manufacturers of household and office furniture, stoves and fittings, there has been a concentration of business in these lines in the Saint Anthony Park suburb, where a commodious "exposition" or sample warehouse and exchange, has been erected, and where assorted car-loads are made up for any part of the Union. The fur trade has always been a prominent feature of Saint Paul's commerce; the traffic in furs, manufactured and unmanufactured, being now exceeded in America only by that of New York. Other unusual specialties among its manufactures, in addition to those found in all large American cities, are hats, macaroni, and linseed oil, all of which are produced in large quantities. The introduction of electric power, from sources above alluded to, is expected to greatly increase the number of manufacturing industries.

Finances and Banking.—The city is the seat of a great deal of private and corporate wealth; but the assessment of property for taxation is kept low. The total assessed valuation for 1909 was \$114,184,375; the levy, 31 mills. The total expenses of all departments of the city government for one year are nearly \$3,000,000. The bonded municipal debt is \$9,867,000; the per capita cost of schools, \$3.44. There are six national banks, whose combined resources for one year were about \$30,500,000. There are also four commercial and three savings banks organized under State laws, and a number of loan and trust companies and private banks.

Newspapers.—In 1910 there were published in Saint Paul more than 50 newspapers, of which five were daily and the remainder weekly and monthly. One of the dailies and several others are in German. The Scandinavian languages also have their newspaper representatives.

Government.—The city has a "home rule" charter, adopted in 1900; amendments to which, proposed by a permanent charter commission, may be made by popular vote at any general election. The mayor holds office for two years, has the veto power over acts of the council, and appoints the various administrative boards and heads of departments. These are a board of police commissioners, of park commissioners, water commissioners, school inspectors, fire commissioners, and the library board; the members of all of which serve without pay. He also appoints the engineer and commissioners of public works, a health commissioner, city physician, corporation attorney and market master, with their assistants. The city treasurer, comptroller and clerk are elective officers. The council is composed of two bodies, an assembly of nine members, elected by general ticket, and a board of aldermen, one from each of the 11 wards.

History.—Had the beautiful and significant Indian nomenclature been preserved, when white men first began to label the geographical points of the upper Mississippi region, the place now called Saint Paul would still have been known by the name of "Innijiiska," the White Rock; an appellation derived from the white bluffs at the bend of the river. Although occa-

sionally the site of an Indian camp, it was not until about 1800 that an Indian village was located in the vicinity. This was in the valley or coulee known as "Pig's Eye," below Dayton's Bluff. Long before that date white men had repeatedly visited the spot; the first, it is believed, being two French traders, Groseilliers and Radisson, in 1658. La Salle mentions the locality in a letter written in 1682. The first American to visit and describe the site was Jonathan Carver, of Connecticut; who, in 1766, made an adventurous journey from Boston by way of Mackinac, across Wisconsin and part of Minnesota; and whose heirs afterward vainly claimed the whole site of Saint Paul, and much adjacent territory, by virtue of an alleged grant made to him by the Indians. In 1703, by the treaty with England, that part of the site lying east of the Mississippi became United States territory; the remainder belonging to the Spanish province of Louisiana. President Jefferson sent Lieut. Zebulon Pike, with 20 soldiers, to take possession. By him most of the ground now occupied by the city and by the Fort Snelling military reservation was purchased from the Sioux for the consideration of 60 gallons of whiskey and a few presents. Congress, however, afterward voted the Indians \$2,000 in cash additional. Between 1783 and 1840 about 200 settlers had located their dwellings on and near the site of the future city. Practically all of them were either Frenchmen or the descendants of Frenchmen, and Catholics; maintaining themselves chiefly by hunting and fishing and traffic with the Indians and pioneering parties of whites. They were visited in 1840 by Father Lucian Galtier, under whose guidance they in the following year erected a church of logs, on the crest of the bluff at the foot of what is now Minnesota Street; and dedicated it to Saint Paul. Steamboats had already made a landing place in the vicinity and it began to be called "Saint Paul's Landing," afterward shortened to Saint Paul. The secret of the city's subsequent growth lay in the fact that it was the most northerly point accessible by the steamboat traffic of the Mississippi. Here must be unloaded the supplies for all the fast-multiplying settlements; not only of the territory of the United States in the Northwest, acquired by the Louisiana purchase in 1803, but for large districts in the British possessions. Hence were shipped valuable cargoes of furs, game, and later, of lumber. The steamboat traffic continued, in steadily increasing volume, until the advent of railroads, between 1860 and 1870, when it entered on a steady decline. But meanwhile the country had been filling up, and the city had entered on a new and broader development. On the organization of the Territory of Minnesota, in 1849, Saint Paul was designated as its capital. At that date the white population of Minnesota did not exceed 1,000. In Saint Paul there were only 32 dwellings. The same year witnessed the incorporation of the town and the establishment of the first newspaper—the 'Pioneer,' which survives in the *Pioneer Press* of to-day. Now set in a period of rapid growth. Incorporation as a city took place in 1854. The following year Saint Paul had a population of 4,716—fully 30,000 having been added to the population of Minnesota in a twelvemonth. The city has ever since been

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the gateway of a human flood which has poured through it to people the Northwest. In the war for the Union, Saint Paul made a remarkable record. Out of a total population, at the beginning of the struggle, of less than 11,000, and a voting population of a little over 2,000, the city furnished, first and last, 1,498 men for the Union army. The city has during its whole career been practically exempt from the scourings by fire, flood, war, pestilence and disorder which have marked the history of other places. Its story since 1865 has been one of steady and quiet growth in commerce, manufactures and population. With its recently greatly increased facilities for taking care of crowds, it is now a favorite point for the holding of conventions.

Population.—The population in 1860 was 10,401; at the close of the Civil War it had reached 12,976; in 1870 it was 20,030; in 1880, 41,473; in 1890, 133,156; in 1900, 163,065. The census of 1910 puts the population of St. Paul at 214,744. The rapid growth of the population has had few parallels among American cities. The foreign element in the population is very large. The total of foreign-born residents in 1900 was 46,819, while native white persons of foreign parentage numbered 72,077 more. Of the foreign-born population, Germany contributed 12,935; Sweden, 9,852; Ireland, 4,892; Canada, 4,572; Norway, 2,900; England, 2,005; other countries, 9,663. See Andrew's History of St. Paul (1890).

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Saint Paul de Loanda, lô-ân'da, Guinea, West Africa, near the mouth of the River Benga, is a sea-port and a bishop's see, as well as the principal Portuguese settlement in this part of Africa. It is built on a slope, the better class of people occupying the heights—the black population the sea-board. Once important it is now in decay. Three forts protect the harbor. There are several commodious government buildings and some stone houses. A railroad from Loanda to Ambaca, 140 miles inland, was begun in 1888. Pop. 15,000.

Saint Paul Seminary, The, a Roman Catholic institution founded at Saint Paul, Minn., in 1894. Buildings, grounds, and an endowment of \$500,000 were given by James J. Hill (q.v.); and the institution became the provincial seminary of the ecclesiastical province of Saint Paul. Archbishop Ireland is president of the board of trustees. The Seminary has two courses in theology and in philosophy; and three departments of instruction, theology, philosophy, and arts; the courses in the department of philosophy include physics, chemistry and biology; the courses in the department of arts include Hebrew, Greek, and music, and form a part of both the theological and the philosophical courses; the study of Hebrew is optional. The Seminary has a campus of 40 acres the land sloping gradually toward the Mississippi; the buildings include the administration building, the class building, two residence halls, a dining hall, a gymnasium, and the chapel (erected 1903). In 1910 the library contained over 10,000 volumes, the students numbered 131, and the faculty 12.

Saint Paul's Cathedral. See LONDON.

Saint Paul's School, a noted college preparatory school at Concord, N. H., founded in 1855 by Dr. George Cheyne Shattuck and incorporated on 29 June of the same year. It was opened on 3 April 1856, its first rector being Rev. Henry Augustus Coit who held that position till his death in 1895. By the terms of the founder's deed the trustees of the school must be communicants of the Protestant Episcopal Church. The course of instruction covers six years and the school is divided into six forms and an upper remove. In 1903 it numbered 350 pupils with 39 masters. The buildings, some 60 in all, are situated in a pleasant rural locality rather more than two miles from the city of Concord, the most important of these, architecturally, being the library, the imposing Upper School (built in 1903) and the spacious chapel, the latter containing a superb oaken reredos and a recumbent marble statue of the first rector of the school. The grounds belonging to the institution comprise about 2,000 acres. Rowing and cricket are the favorite sports of this school. The library contains 13,000 volumes and there are two literary societies, the Cadmean and the Concordian. The school journal, 'Horæ Scholasticæ,' was founded in 1860 and is issued monthly. Consult: Adams, 'Some Famous Schools' (1903).

Saint Paul's School, London, England, an endowed grammar school, founded by John Colet in 1512, with no limitations as to country, nation or class. It was built to accommodate 153 students and until 1884 stood in Saint Paul's churchyard. It was instituted for the free education of poor children. The original building was burned down in 1666. In 1824, the second one, built by Wren, was taken down and another erected. In 1884 a new school was opened at West Kensington. The course of study was formerly classical, but is now designed to prepare for army examinations.

Saint Peter, one of the twelve Apostles of Jesus Christ. Peter (from the Greek *πέτρος* a rock, of which the Aramaic equivalent was Cephas) was the son of a certain John or Jonah (cf. John i. 43; Matt. xvi. 17). He was born at Bethsaida of Galilee (John i. 44; xii. 21) but afterward resided at Capernaum where he had a house and was engaged in the fishing business in partnership with his brother Andrew and Zebedee and his sons James and John. (Mark i. 16-20; Luke v. 10-11). His proper name was Simon or Simeon, but the surname Cephas given him by Jesus (John i. 43; cf. Matt. xvi. 18) became, in its Greek form, Peter, the name he was generally known by in the early Church.

Since the firm to which Peter belonged owned boats and nets and hired assistants it is needless to think of Peter as poverty stricken, though it is not probable that he was wealthy.

Of his education we know practically nothing. It is likely that he spoke ordinary business Greek as well as his native Aramaic, for Galilee was largely bi-lingual. He may have been able to read the Old Testament in Hebrew. However, he was not "learned" in the rabbinical sense (Acts iv. 13). He was probably familiar with the Greek Old Testament, but knew but little of the Jewish scholarship of the day.

When John the Baptist appeared in the lower Jordan Valley with his announcement of the

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coming crisis, Peter and his business partners were among the many Galileans who went to hear the great preacher. Here he became acquainted with Jesus (John i. 40). This first acquaintance did not immediately result in full discipleship, since Jesus had not yet opened His public ministry. It is uncertain to what extent Peter accompanied Jesus before he was formally called when Jesus opened His Galilean ministry (Mark i. 16). Yet it was the earlier acquaintance with Jesus that prepared the way for the summons to a life-work (Mark i. 16; Luke v. 11), when at Jesus' word Simon left his nets and boats and became one of the daily companions of the Great Teacher. As yet, however, he was only one among many whom Jesus attracted to Himself during the early months of His work in Galilee. It was a testing time for Simon. He showed such appreciation of Jesus' person and teaching that he was chosen by Jesus to be one of 12, selected from the larger body of "disciples" who were to be "apostles," that is, intimately associated with Him to learn of Him and (ultimately) be sent out by Him to declare His message and carry on His work (Mark iii. 14). With the brothers James and John he made a group of three with whom Jesus was most intimate and who alone were associated with Him on such occasions as the transfiguration and the prayer in the garden of Gethsemane. To Peter and his companions Jesus' refusal to allow the enthusiastic crowds, after the feeding of the five thousand (Mark vi. 31-44; John vi. 14-15) to proclaim Him as Messiah must have been a great disappointment. But the Twelve remained steadfast and it was Peter who voiced their conviction a little later, in response to Jesus' searching question, that Jesus was indeed the Messiah (Mark viii. 29ff., John vi. 68). This confession drew from Jesus the commendation "thou art Peter (that is, rock) and on this 'rock' I will build my church" (Matt. xvi. 18). The explanation of these words has been a subject of much dispute. Roman Catholics hold that by them Christ conferred a personal supremacy over the Church upon Peter. Protestants deny this, and regard them merely as referring to the truth Peter uttered as the foundation of His Church. When Jesus soon after declared that it was necessary for Him to go to Jerusalem and suffer, Peter protested and was rebuked. The transfiguration scene opened his eyes more fully to the significance of Jesus' person. Thus his education proceeded, new lessons being learned daily. He was, of course, present during the experiences of Passion Week. He and John were sent into the city to prepare the Passover meal which became the Lord's Supper. He witnessed the agony in the garden. When the band arrested Jesus, Peter drew his sword and struck off the ear of one Malchus. Though with the others he fled when Jesus was arrested he followed the party into the city and through the influence of John gained admission into the palace where Jesus' trial was proceeding. Here his fickleness and cowardice again overcame him, and when taunted by a servant maid he denied with an oath that he knew Jesus. Overcome by shame he went outside and wept, but was a witness of Jesus' sufferings on the cross if not of His trial before Pilate. These scenes were so indelibly stamped

on his mind that years after they retained their impression and shaped his thinking (1 Peter ii. 23; v. 1). The despair that settled over his soul when he saw his beloved Master die was not lighted by any definite hope of a resurrection. But when the women who were at the sepulchre early Sunday morning came with the news of an open and empty tomb, Peter and John ran to investigate. They found the tomb empty and returned to their company. Peter was the first of the Twelve to whom Jesus showed Himself after His passion (Mark xvi. 1-8; Luke xxiv. 35; John xx. 1-10; 1 Cor. xv. 5). For Peter this was a new birth, filled with a living hope (1 Peter i. 3). Later Jesus restored Peter to his full apostolic position (John xxi.).

Peter now took a leading part in the direction of the little band of disciples that was the nucleus of the Christian Church. He proposed the election of a successor to Judas Iscariot (Acts i. 15ff.) and on the day of Pentecost made the first statement of Christian doctrine to the world. The sermon as given in Acts ii. 14-36 centres about the necessity of proving to the Jews that the crucified but now risen Jesus was indeed God's Messiah. The argument from the analogy between ancient prophecy and the recent events connected with Jesus was a convincing one to many Jews, and large numbers confessed their faith in Jesus as Messiah. Until the persecution because of Stephen the new movement was confined almost exclusively to Jerusalem, and it was Peter who had the chief share in the guidance of affairs. His associate was John. These two figure prominently in the accounts of the first conflicts with the Jerusalem authorities (Acts iii.-iv.). It was Peter who rebuked Ananias and Sapphira for their covetousness (Acts v. 1-11), who was spokesman for the apostles in their formal trial before the Sanhedrim (Acts v. 17-42), and whose fame was such that later tradition said that even his shadow was able to perform miracles (Acts v. 12-16). After the martyrdom of Stephen the Christian movement took on larger proportions. The work spread throughout Palestine and into neighboring countries. To a certain extent it was supervised by the apostles. The Acts preserve a record of two visitations by Peter in this connection. The first was when he and John were sent by the apostles to oversee the evangelistic labors of Philip in Samaria. Here Peter came in contact with the magician Simon, severely rebuking his cupidity and lack of spiritual perception (Acts viii. 14-25). The second tour was an extensive one in the regions to the northwest of Jerusalem (Acts ix. 32ff.). On it he healed Eneas at Lydda and raised Tabitha at Joppa. From Joppa he was summoned by a vision and by messengers from Cornelius, a centurion stationed at Caesarea, to preach the gospel to the latter (Acts x.). This was the first recorded preaching of the gospel by Jewish Christians to Gentiles. In this matter Peter came to a result he had not anticipated at first. At the end he found himself doing what he had never done before, fellowshipping freely with Gentiles, recognizing them as Christian brethren and eating with them.

Naturally such conduct provoked sharp criticism on the part of the stricter members of the Jerusalem Church. When Peter returned to Jerusalem he was called upon to give an account

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of his doings. His defense was that he had been guided by the Holy Spirit and that the Spirit's presence had been manifested while he was preaching to the Gentiles (Acts xi). Sometime after this Peter was arrested by order of Herod Agrippa I., and imprisoned in Jerusalem with a view to executing him on the following day. But he escaped and left Jerusalem immediately (Acts xii. 1-17). Whither he went is not said and for all further knowledge of Peter's movements we must trust to incidental statements in the New Testament or to the very uncertain notices in early Christian literature. Since Herod Agrippa died in 44 A.D. the events narrated in Acts i. 12, in case they are arranged in anything like chronological sequence, must have covered a period of about 15 years. We may say then that for that length of time Peter was the foremost figure of the early Apostolic Church. During this period, three years after his conversion, Paul visited Jerusalem to talk matters over with Peter (Gal. i. 18), staying with him 15 days. This must have been somewhere near 40 A.D. His subsequent career was, doubtless, just as important, but its details have not been preserved. About 49 A.D. Peter was present at the council in Jerusalem and took a leading part (Acts xv. 6 ff; Gal. ii. 1-10). By this time he had become recognized as the "Apostle of the Circumcision" (Gal. ii. 7), through whom God was working as effectually as He was through Paul for the "Uncircumcision" (that is, the Gentile world). These expressions of Paul seem to indicate that Peter's activity was—like his own—largely missionary in character, to the Jews of the dispersion, as his was to the Gentiles. For this reason Peter was in Jerusalem only occasionally after his escape from Herod Agrippa in 44 A.D. We learn further, from Gal. ii. 11-14, that at Antioch, either soon after the Council of 49, before Paul set out on his second missionary journey (49-52 A.D.), or at the close of that journey when Paul was at Antioch for a while (Acts xviii. 23), Peter was sharply rebuked by Paul for weakly yielding to emissaries of the strict Judaistic party of Jerusalem and withdrawing from familiar fellowship with the uncircumcised Gentile members of the Church. It is of interest to note that Paul's own words in Galatians imply that Peter, Barnabas, and others had been in the habit of thus freely mingling with Gentile Christians, which is only what we would infer from Acts x.-xi. Full fellowship with the Gentile converts was not discussed at the Council of 49, and Peter's withdrawal did not violate the terms of the agreement reached in the council. It violated the principles there followed, however, and deserved Paul's rebuke.

For the remainder of Peter's career we are in almost total ignorance. He appears to have continued his missionary labors. In these he was frequently accompanied by his wife (1 Cor. ix. 5). Early Christians looked back to him as the first bishop of the Church of Antioch. Whatever truth there may be in this tradition it is certain that he did not organize that great Church. Other ancient traditions speak of his labors in Asia Minor, especially in the regions near the Black Sea. These may be no more than inferences based on the address of the First Epistle. At what point in this

later period are we to place the two epistles attributed to him? The authenticity of the first is more certain than that of the second. It was written from "Babylon" to the "dispersion" of northern Asia Minor. Both terms have been taken in a figurative sense and most scholars hold that it was written from Rome to Gentile Christians in Asia Minor. Neither of these positions rests on any very substantial evidence, though it is just more than possible that the letter was sent from Rome. Mark was with the apostle at the time, also Silvanus, who appears to have penned the epistle (v. 12-13). Since Silvanus was Paul's companion as late as when he wrote 2 Cor. (i. 19) Peter's letter must be dated after 55 A.D. And since Paul's later letters from Rome, Philippians, Colossians, Ephesians, and Philemon (59-61 A.D.) betray no evidence of personal contact with Peter in Rome, the probability is that Peter was in Rome between 56 and 59, and thence sent his message to the churches of Asia Minor; not to the Pauline churches there, but to other communities that were less directly connected with Paul's work. To what place Peter went after leaving Rome, whence he sent the second letter, in case it is his, and whether he returned to Rome,—all these are matters on which we possess no direct information. According to a widespread tradition, which has become generally accepted in Christendom, Peter suffered martyrdom at Rome. It must be admitted, however, that the direct evidence for this tradition cannot be traced much farther back than 180 A.D. At that time it was the firm belief of the Roman Church that both Peter and Paul were martyred at Rome and that the places of their martyrdom (or burial) could be pointed out. The same tradition thought of them as the founders of the Roman Church. All that can be said is that there is no sufficient ground for rejecting the kernel of the tradition, that is, that Peter was at Rome for a longer or shorter period and probably suffered martyrdom at that city. The Roman Catholic Church accounts Peter as the first Bishop of Rome and the first Pope.

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Saint Peter, Minn., city, county-seat of Nicollet County; on the Minnesota River, and on the Chicago N. W., and the Chicago, St. P., M. & O. R.R.'s; about 73 miles southwest of Saint Paul. It was settled in 1854 by Captain W. B. Dodd; incorporated in 1865, and chartered as a city in 1873. It is in a farming and lumbering region and in the vicinity are limestone quarries. The chief manufactures are flour and lumber mills, machine-shops and foundries. There are in all about 25 industrial establishments. The State Hospital for the Insane located here, accommodates about 1,200 patients. The educational institutions are the Gustavus Adolphus College (Lutheran), 300 students; public and parish schools, a private business school, and a Carnegie Library. The two banks have a capital of \$100,000. The government is vested in a mayor and a board of aldermen elected annually. A number of the inhabitants are Germans and Scandinavians; but the American-born predominate. Pop. (1910) 4,800.

SAINT PETER PORT—SAINT PETERSBURG

Saint Peter Port, Channel Islands, capital of the Island of Guernsey, on the east coast rises in terraces on the slope of a hill, and presents a very attractive appearance from the sea. The streets are narrow and steep; the environs exceedingly beautiful, studded with handsome residences. The most interesting buildings are St. Peter's cathedral-like church, Elizabeth College (1563), Ladies' College, public hospital, and the handsome market. The Guille-Allés Library, opened in 1882, contains 80,000 volumes. The Royal Court-House is used both as court of justice and as parliament house. The harbor is large and commodious, and is defended by the picturesque mediæval Castle Cornet on a rocky islet at its mouth and by Fort George, a regular fortification on the heights, about one half mile south from the town. Pop. about 20,000.

Saint Peter's College, or **Peterhouse**, England, is the oldest college in the University of Cambridge. It was founded as a hospital and converted into a college in 1286. This and the other sister colleges were modeled after the monasteries, to a certain extent. The present chapel was opened in 1632. The hall and combination rooms have been restored. The poet Gray belonged to this college; also Isaac Barrow, Archbishop Whitgift and Sir William Thomson.

Saint Peter's Lake, Canada, an expansion of the Saint Lawrence River, between the mouths of the Saint Maurice and the Richelieu. It forms the outlet of many rivers, chief of which is the Saint Francis. In its southern portion are found many islands, notable for their fine scenery. The length of the lake is 35 miles; the breadth, 10 miles.

Saint Peter's, Rome. See **ROME**.

Saint Petersburg, *pe'térz-bérg*, Russia, the capital of the empire, on the delta of the Neva, at the head of the Gulf of Finland, 400 miles from Moscow, covers an extensive area embracing the banks of the river bordering the mainland as well as numerous islands formed by the many branches of the Neva. Many bridges connect the islands with the mainland and with each other, and these are of various construction, only two of them being permanent; two are built on boats and removed semi-annually, and when the ice descends from Lake Ladoga; the others are built of wood. The city lies very low, on marshy land, which renders it very unhealthful and subjects it to disastrous inundations. About 200 canals have been constructed which obviate this condition somewhat as they receive the surplus water due to heavy gales and the melting of ice and snow in the spring. The banks of the principal canals—chiefly in the Peninsula or Great Side of the city, are protected by solid walls of granite; they are navigable for boats of deep draft. The quays of the Neva are more extensive and substantial than those of any other European city. The great forests extend to the very confines of the town in one direction, while marshy bogs are characteristic everywhere. The most important portion of Saint Petersburg is that south of the Admiralty, from which radiate the principal streets—the Nevski-Prospect—one of the finest streets of the world—the Gorkhovaya Ulitsa, and the Vasnesenski-Prospect. These streets contain the palaces of the court and nobility and of the

better classes. Other streets run parallel to these and to the canals. All are spacious but poorly paved (beyond, on the right bank of the Neva are the homes of the laboring classes). The main buildings are generally erected on wooden piles in large plots. This part of the residential district on the south bank of the Neva occupies the Peninsula or the Bolshaya or Great Side, that on the north bank, including the islands, Petersburg. The latter section contains the commercial and business district and also the important docks and warehouses, the stock exchange, scientific institutions and many schools and colleges. On the Peterburgskiy Island stands the old fortress of Saint Peter and Saint Paul, facing the Winter Palace; it contains the Mint and the ancient cathedral, where all the Russian sovereigns and their families are interred. Here are political prisons, behind which stands the arsenal, and in the wide streets are the houses of the minor government functionaries. Many of the islands contain attractive parks and summer homes of the wealthy. In the midst of a spacious square stands the old Admiralty, whose light and graceful spire is its chief feature; it contains several collections. Near it are grouped the principal buildings of the capital, which include the "Glavny Shtab," containing the Foreign Office and Department of Customs; the War Department; the Cathedral; the Senate and the Synod, and nearby the equestrian statue of Peter the Great. On the right, is the Winter Palace, and the Hermitage Gallery of Art. The former is the largest palace in the world and is a city in itself when occupied by the royal family, accommodating 6,000 persons. Its fine halls are rich in statuary, paintings and gems of art, including the tables of rare malachite. The great court ceremonials take place in this palace, and in its treasury are preserved the costly crown jewels. The Hermitage is a classical structure, built by Catharine II., but reconstructed in 1840-50. It contains the finest art collection in Russia, including sculptures, and masterpieces, representing the Spanish, Dutch, Flemish, French and Italian schools. In Petrovskiy Square stands the cathedral of Saint Isaac, whose gilded domes are conspicuous from all parts of the city. It is of almost cubic form and void of any artistic beauty, its peristyles of colossal red granite monoliths create, however, a striking impression. Its interior decorations are rich, its paintings representative of Russian art for a whole century; on a large square south of the Cathedral stands a monument to Nicholas I., a rather stiff Doric column; other monuments are that to Catharine II.; one commemorating the Russo-Turkish war, etc. The arsenal contains a museum of artillery. The Academy of Sciences has an extensive museum and art collection, and a library of 300,000 volumes, etc. The imperial library is one of the most valuable in the world. It contains about 1,200,000 volumes, 34,000 manuscripts, and 75,000 engravings. This collection was drawn largely from Polish libraries. There are four theatres in which plays and operas are rendered in different languages. In all parts of the city the lofty watch-towers are conspicuous, and are used for signaling danger by fire or water. The general style of architecture is nondescript, and lacks the picturesque element—masses of architecture in endless lines, often gorgeous, but tasteless. Of the 400 churches, besides those

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noted, are the Cathedral of Our Lady of Kasan; the church of Saint Alexander Nevskoi; the church of the Smolnoi convent; and church of the Preobrazhenskaya — rich in military trophies. The chief scientific and educational institutions, of which there is a vast number and variety, besides those already mentioned, include the University, the Ladies' University, the Mining Institute, engineering, naval and military technological and medical institutes and art academies and make Saint Petersburg one of the great intellectual centres of the world. It is also the seat of the Russian publishing trade, and 120 newspapers are printed. The palaces not mentioned are: The Marble, Taurida, Annitchkoff — favorite residence of the Czar — and the new Michaeloff palace, the most elegant building of the capital. The government buildings are remarkable for their size. There are various hospitals and benevolent institutions. The manufactures of Saint Petersburg are extensive and valuable. Most important are the manufactures of Gobelin tapestry, of glass, porcelain, military surgical instruments, articles of malachite and precious stones, and embroideries. There are besides large foundries, the manufacture of textiles, leather, paper, tobacco, jewelry, clocks, etc. The commerce of the city is enormous; 12,000 to 13,000 vessels large and small enter the Port of Cronstadt, 16 miles distant, laden with produce of field and forest; and tons of various goods, including corn, are brought to the city by the railroads. The new and extended railway systems have added to a rapid development of trade and industry. Large quantities of grain and other natural products are annually exported, whose value is variously estimated — according to crops — from 73,000,000 to 96,000,000 rubles. The climate, though not very severe, is subject to sudden transitions of temperature; the rate of mortality is greater here than anywhere else in Europe. Two centuries have elapsed since the capital of the Muscovite empire (1702) was founded by Peter the Great, transforming Russia from an Oriental into an Occidental power. He forced Western civilization upon his subjects; compelling them to help build up the capital by residing there, and every vessel by bringing stone in her cargo, to build the walls and pave the streets. The loss of life in constructing the city (owing to the unfortunate site — a Finnish marsh) cannot be calculated. It is now the headquarters of the political, social, military and administrative life of all the Russias, one of the most instructive examples of national development. Pop. about 1,600,000.

Saint Petersburg, Declaration of, an agreement between the European powers made in December 1868 at Saint Petersburg; signed by representatives of Austria, Belgium, Bavaria, Denmark, France, Great Britain, Italy, the Netherlands, Persia, Portugal, Germany, Russia, Sweden, Norway, Switzerland, Turkey and Württemberg. The powers agreed to use in war no explosive projectile of less weight than 400 grams or 14 ounces avoirdupois. Other provisions were made to reduce the death rate and alleviate the suffering of injured and disabled soldiers by the use of more humane implements of war.

Saint Petersburg, University of. See SAINT PETERSBURG.

Saint Philip. See FOGO.

Saint Philip, Fort. See FORT JACKSON AND FORT SAINT PHILIP.

Saint Pierre, Jacques Henri Bernardine de, zhāk ön-rê bär-när-dën de sãn pē-är, French author: b. Havre 19 Jan. 1737; d. Eragny sur-Oise 21 Jan. 1814. He received his education at Caen and at Rouen, and entered the government service as a civil engineer. Dismissed for insubordination, he wandered about the continent for several years before he began to write. His first book, 'Voyage à l'Île de France' (1773), an account of his voyage to the island of Mauritius, did not attract attention. Sixteen years later his experiences in this lonely island became the background of his celebrated novel, 'Paul and Virginia,' which was published in Paris in 1788, and almost immediately translated into English, Russian, Polish, Dutch, Spanish and Italian. He was the author of two other novels little known beyond his day, and of two volumes of poetical studies of nature: 'Études de la Nature' (1784); and 'Harmonies de la Nature' (1796). His works besides those already mentioned are: 'Essai sur Jean Jacques Rousseau'; 'La Chaumière Indienne' (1790); 'Le Café de Surate' (1790); and his 'Correspondance' (1826). Consult: Barine, 'Les Grands Écrivains Français' (1891); Maury, 'Étude sur la Vie et les Œuvres de Bernardin de Saint Pierre' (1892).

Saint Pierre, Jacques Legardeur de, zhāk lā-gär-dër dë, French soldier: b. Normandy 1698; d. near Lake George, N. Y., 1755. He entered the army in early youth and went to Canada where he served against the Iroquois and against the English in the war of 1740. He was one of the first to explore the Rocky Mountains, making the journey up the Saskatchewan River in 1752 and on his return was ordered to Fort de Beauf, Ohio. While in command there he received George Washington, then adjutant-general of Virginia, who brought a letter from Governor Dinwiddie requesting the withdrawal of French troops from English territory. Washington in his journal comments very favorably on the French commander. Saint Pierre was succeeded by Contrecoeur in 1753 and was appointed to the command of the Indian auxiliaries. He rendered valuable services in Baron Dieskau's expedition and was afterward killed in the action near Lake George where Whiting's regiment was routed. His account of the Rocky Mountain expedition is preserved in the National Library of Paris and was published in the collection of John Gilmary Shea, 'Mémoire ou Journal sommaire de Jacques Legardeur de Saint Pierre' (1862).

Saint Pierre, a town on the island of Réunion, in the Indian Ocean, on the west coast, 34 miles south of Saint Denis, the capital, and the terminus of a railway 83 miles long, connecting with the capital, with Pointe-des-Galets, the chief port, and with Saint Benoit on the east coast. See RÉUNION.

Saint Pierre, West Indies, a seaport town in the volcanic island of Martinique (q.v.). Prior to the eruption in 1902 of Mont Pelée (q.v.), Saint Pierre was the largest and most flourishing city not only of Martinique but of the Lesser Antilles. It was an important seaport and a bishop's see. The principal buildings were



1. The Cathedral of St. Isaac, St. Petersburg.
2. The Column Alexander and the Admiralty.

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the cathedral, lyceum, and palace of justice. There was a fine botanical garden containing rare and peculiar specimens, etc.—all destroyed by the sudden catastrophe above noted, together with the entire population.

Saint Pierre and Miquelon, mēk-lôn, two islands belonging to France, and situated 10 to 40 miles off the south coast of Newfoundland, in lat. 47° N. and lon. 56° 20' W. Miquelon, the larger, is 24 miles long and 6 miles wide, and the two have a combined area of 91 square miles. Miquelon consists of two high, rocky, and barren portions connected by a low neck of sand. Saint Pierre is also a rugged mass of barren granite, and both are surrounded by rocks and reefs. Saint Pierre, however, is the most populous and the residence of the governor. Here is a town of a thoroughly French type, with a wooden cathedral, and administrative offices including the American terminus of the French-Atlantic cable. The islands, the last vestige of France's North American colonies, are important as a station for the French fishing fleets in Newfoundland waters. During the fishing season they are visited by hundreds of vessels and thousands of fishermen, and export annually 30,000 to 40,000 tons of fish. They underwent many political vicissitudes until they were finally ceded to France by England in 1816. Pop. 6,352. Consult Caperton, 'Saint-Pierre et Miquelon' (1900).

Saint Quentin, sǎn kôn-tǎn, France, in the department of Aisne, stands on an acclivity overlooking the Somme, about 95 miles northeast of Paris. Prominent among its buildings is the fine Gothic church of Saint Quentin, erected 1114-77, with a special feature of double transepts. Other buildings are the court-house, library, theatre, hospitals and lyceum. The principal manufactures are cotton and woolen goods, tulle, embroideries, lace and guipure of several kinds; there are important foundries, machine-works for various special industries, brick and tile yards, and in the vicinity, numerous sugar mills. There is an active commerce in cotton and linen yarn, and in grain. Several monuments and statues commemorate the defense of the town and its native literary celebrities. The location of Saint Quentin is of considerable strategic importance, and it has figured conspicuously in various wars, notably in 1557 and in the Franco-German war, 1870. Pop. about 53,000.

Saint Regis, rē'jīs, N. Y. and Canada, village, part in Franklin County, N. Y., and part in Huntington County in the Province of Quebec; on the right bank of the Saint Lawrence River, at the mouth of the Saint Regis River. It is an Indian village, and is owned by members of the Iroquois tribe. It is about five miles from a railroad station in New York State; but it has steamboat connection with Cornwall, Ont., and in summer with all the Saint Lawrence River ports and with Hogsburg in New York, on the Saint Regis River. The village is in a fertile agricultural region; the Reservation extends along the Saint Lawrence, in both the United States and Canada, for a number of miles. Many of the Indians are engaged in farming, but the chief occupation is basket-making in which they excel. There are two churches, a Roman Catholic on the Canadian side, and a Methodist on the New York side, on the

boundary of the Reservation. There are five schools in New York and two in Canada. Eleazar Williams (q.v.) lived for some time in Saint Regis. Pop. 1,400.

Saint Regis Indians, a group of Roman Catholic Iroquois from Caughnawaga, Quebec, who during the French and Indian war were established in a village on which is now its boundary between New York and Quebec. The Jesuits founded among them the mission of Saint Francis Regis, hence their present name. These Indians remained neutral during the Revolution, and their number was considerably augmented by other Iroquois early in the 19th century; but their reservation extending across the international boundary, they were divided in partisanship during the War of 1812. The present population is 2,540, of whom 1,386 are on the Quebec side and 1,154 within the United States.

Saint Remy, sǎn rē-mē, France, in the department of Bouches-du-Rhône, near the forest of Saint Benoit, is a village 14 miles northeast of Arles. It is celebrated for its Roman antiquities, the chief of which are the triumphal arch (100 A.D.) and the monument of the Julii. The latter is attributed to the period of the early empire; and consists of a square base ornamented with military bas-reliefs, surmounted by Corinthian semi-columns connected by arches, which support a second series of 10 Corinthian columns, and a dome. Two statues stand in the upper portion. In 1870, in the vicinity of Saint Remy, the Germans won a victory over the French.

Saint Ronan's Well, a novel by Sir Walter Scott, published in 1823. The scene is laid about a mineral spring, a quasi watering place, called Saint Ronan's Well. The book is the only society novel attempted by Scott.

Saint-Saens, sǎn-sǎn, Charles Camille, French musician: b. Paris, France, 9 Oct. 1835. He received his musical education in the Conservatory of the metropolis and in 1853 was appointed organist of the church of Saint Méry, and in 1858 of the Madeleine, where he continued till 1877. His first comic opera, 'La Princesse Jaune,' was produced in 1872, and 'La Timbre d'Argent' in 1877. 'Samson et Dalila,' a sacred drama, was produced at Weimar also in 1877, and was subsequently successfully revived at Rouen. His grand operas 'Etienne Marcel'; 'Henry VIII' (1883); 'Proserpine' (1887); 'Ascanio' (1890); 'Phryne' (1893), have not maintained their early popularity to the present day. He is also known as a musical critic and has published 'Rimes familières' (1886); 'Problèmes et Mystères' (1894). He was elected member of the Academy in 1881. Although he has not attained the highest rank in opera, many of his instrumental works, which include three symphonies, four symphonic poems, two orchestral suites, several concertos for piano and orchestra, and violin and orchestra, and a quantity of chamber music, show consummate talent, if not genius.

Saint Simon, Claude Henri, klod'ōn-rē sǎn-sē-mōn (Eng. sǎnt sī'mon), COMTE DE, French socialistic reformer: b. Paris 17 Oct. 1760; d. there 22 May 1825. Born of a family which traced its descent to Charlemagne he conceived that his origin destined him to great achieve-

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ments. At 13 he offended his father by skeptically refusing to receive his first communion. Before he was 16 he gave his servant orders to call him in the morning with the summons, "Rise, M. le Comte, you have great things to do." At 18 he entered the army and he served in the closing campaigns of the American War of Independence. Returning home with the order of Cincinnatus, he was captured in the naval combat in which the French were defeated by Rodney, and remained a prisoner at Jamaica till the peace of 1783. On his return he was created a Knight of Saint Louis, and appointed colonel of a regiment; but after a brief period of garrison duty at Metz, abandoned the service in order to travel. He went to Holland in 1785, and to Spain in 1787. Here he was successful in introducing diligences in Spain. On the outbreak of the Revolution of 1789 he joined himself to those who petitioned the assembly for the abolition of titles of nobility, but took no further part in the political movements of the time; being wholly absorbed in the pursuit of wealth. Speculation in the national domains created by the confiscation of the effects of the nobility and clergy afforded unlimited scope for his ambition. In this career he was joined by De Redern, whom he had known in Spain. Their speculations were at first unfortunate. Redern fled and Saint Simon was imprisoned as a nobleman for 11 months. On his liberation he realized a considerable fortune by paying for the property he had acquired in assignats, the market value of which had fallen to 6 francs the thousand, while they were still received at full value in payment of the national domains. During his imprisonment he had plenty of time for reflection and the thoughts he entertained may be guessed from a vision which he had. "Charlemagne," he relates, "appeared to me and said, 'My son, your success as a philosopher will equal mine as a warrior and statesman.'" In order to fulfil the mission which he had thus received he became in his 38th year a student of science, resided opposite the Ecole Polytechnique, and subsequently the Ecole de Medecine, in order to enjoy communications with the professors, whom he invited to his table.

He married in 1801 Mlle. de Champgrand, and in the course of a year he ran through his fortune. After this he parted with his wife by divorce. In 1802 and 1803 he traveled in England and Germany, without, as he says, acquiring any new experience of importance. During his stay at Geneva he produced his first work, 'Lettre d'un Habitant de Genève à ses Contemporains.' He proposed that the savants should be maintained at the public expense; that spiritual power should be in their hands, temporal in that of the proprietors; while the "great chief of humanity" should be elected by the masses. Religion, he observed, was merely a human invention. Having exhausted his means he obtained the post of a clerk at the *mont de piété*. At this time he encountered Diard, whom he calls his only friend. This associate not only took on himself the charge of his maintenance, but provided means for the publication of his works.

The death of Diard in 1810 plunged him again into want; and having written two more works, 'Sur la Science de l'Homme,' and 'Sur la Gravitation Universelle,' he found himself with-

out means to publish them. Later Augustin Thierry, who became his intimate disciple, co-operated in editing his work on the 'Réorganisation de la Société Européenne' (1814), in which he endeavored to demonstrate the uselessness of the Congress of Vienna, and to show that a European parliament, with the right to determine differences between different nations, was the only means of preserving general peace; and for the promotion of this he advocated union between England and France. The last proposal, perhaps the most sensible he had yet made, caused him to be regarded as a madman. This was his first work which attracted general notice. Finding the difficulty of procuring the means of subsistence and of publishing his works increasing he made an unsuccessful attempt in 1823 at self-destruction, which resulted in a mutilated visage and the loss of an eye. He next produced his last work, 'Le Nouveau Christianisme' (1825), to which he owes his position as the founder of a sect. Christianity he now averred to be a progressive system, which had been rendered immovable by the bonds of ecclesiastical law. Taking its fundamental principle of love he held the church to be a complete organization of society for ministering to the wants of the whole, and especially of the more numerous and poorer classes. A social hierarchy based on capacities and services, with authority to divide heritages, distribute salaries, regulate vocations, and take all necessary means for making the labor of all contribute to the common good, was deduced from these premises by his disciples, among whom may be mentioned Olinde Rodrigues, Léon Halévy, Bailly (de Blois), and Duvergier. Saint Simon continued to the last to develop and promulgate his views in a periodical publication, 'Le Producteur.'

The disciples of Saint Simon rapidly grew into a sect, and were joined by other eminent men. They attempted to idealize the life of their founder, and make it a consistent whole, dominated from the first by the idea of the mission he was to accomplish. Society was divided by the Saint Simonian doctrine into three classes, priests, savants, and laborers, and was to be governed by the chiefs of the three classes. Capacity was to be the ground of distribution of functions. All property was to become on the death of the proprietor the property of the church or society. All children were to receive a general education till their particular capacities became manifest. Saint Simonism in short, was an attempt to render men benevolent by external regulations; to do the work of Christianity without its authority and without its weapons.

Consult: Booth, 'Saint-Simon and the Saint-Simonians' (1871); Janet, 'Saint-Simon et le Saint-Simonisme' (1878); Weill, 'Un Précurseur du Socialisme' (1894); Warschauer, 'Saint-Simon und der Saint-Simonismus' (1892); Weill, 'L'Ecole Saint-Simonienne' (1896); Charléty, 'Histoire du Saint-Simonisme' (1896).

Saint Simon, Louis de Rouvroy, Duc de, French author: b. Paris 5 Jan. 1675; d. Laferrière 2 March 1755. He was employed in several diplomatic missions, and was one of the council of regency under the Duke of Orleans, after whose death he retired to his estates. His memoirs commenced in 1694, while serving in the army, and on which he labored for 60 years re-

mained a long time in manuscript, and were afterward published in a mutilated form, with many suppressions. The first complete edition appeared in Paris in 1829-31 (in 21 vols.), entitled *Mémoires complets et authentiques du Duc de Saint Simon sur le Siècle de Louis XIV., et la Régence, publiés pour la Première Foix sur le Manuscrit Original Entièrement Ecrit de la Main de l'Auteur*, par M. le Marquis de Saint Simon.

Saint Simon, *sânt si'mon*, an island of Georgia, at the mouth of the Altamaha River, and separated from Jekyl Island, on the south, by Saint Simon Sound, and from Wolf Island on the north, by Altamaha Sound. In 1733 this island, together with some of the mainland adjacent, was ceded to James Oglethorpe by the Creek Indians. The settlement on the island was attacked in 1742 by a Spanish force from Saint Augustine. The soil is fertile, and the vegetation luxuriant.

Saint Sophia, *sô-fô'a*, Constantinople, a renowned church and mosque, founded in 325-6, by Constantine, at the time when Byzantium became the seat of empire. Saint Sophia was enlarged, rebuilt, destroyed at various epochs, but the present structure is virtually that erected by Justinian. Over 10,000 workmen were employed seven years in its construction, and the rich materials used were taken from nearly every celebrated pagan temple in all parts of the kingdom. The building was approached by a double porch 100 feet in depth. The building formed a square of 241 feet, whose interior represented a Greek cross, surrounded by a woman's choir or gallery, supported by magnificent ancient pillars. A series of domes rise from the centre and rest upon each other, tier upon tier. The height of the dome is 175 feet. The interior was decorated throughout with sculptured marble and fine mosaics. The sedilia of the patriarch and those of the priests were of silver gilt; the dome of the tabernacle of pure gold, surmounted by a massive gold cross studded by precious stones. The sacred vessels and other apparatus were of pure gold; the altar-cloths embroidered with gold and pearls, and the altar itself consisted of molten gold into which had been thrown pearls, sapphires, diamonds and all gems which might enhance its value to the utmost. Its weight amounted to 320,000 pounds, and its total cost was £13,000,000 or \$65,000,000. When the Turks took possession of Constantinople, they transformed Saint Sophia into a mosque, destroying or concealing the Christian fittings or emblems, by coats of plaster. The mosaic pictures were saved in this way, and when Abdul Medjid ordered a complete restoration of the building, the original mosaics of Justinian were discovered. With the sultan's consent, the king of Prussia sent German artists to make accurate copies of these interesting antiquities, which have been published by M. Salzenburg, the artist, at the expense of the Prussian government. The interior is at present restored for Mohammedan worship, and all Christian decorations, especially those representing the human figure, strictly forbidden by the Koran, are hidden from view under a white coating in which mosaics are imitated. Like all mosques, Saint Sophia is closed to all Christian visitors except by special permission, which is easily obtained by the hotel proprietors.

Saint Sulpice, *sân stîl-pê*, the name of a famous seminary in Montreal, Canada, whose building is the oldest in that city, dating back to 1684. It is also the name of a famous seminary for priests in Paris, France.

Saint Swithin, an English prelate of the 9th century. He was ordained to the priesthood in 830, was charged with the education of Prince (afterward king) Alfred, and in 852 was made bishop of Winchester. He died about ten years later. He was canonized a century later. The popular knowledge of this saint's name is due to the belief that if rain falls on 15 July (which is popularly known as Saint Swithin's Day) it will rain for six weeks after. This notion is said to have arisen from the fact that when the bones of Saint Swithin were about to be removed, after his canonization, from their original resting-place in Winchester church-yard to the interior of the cathedral, their removal, which was to have taken place on 15 July, was delayed for 40 days by the excessive rains which fell uninterruptedly for that period.

Saint Thomas, one of the Virgin Islands, Danish West Indies, lying 43 miles east of Porto Rico; area 33 square miles. The surface is hilly, and only a small portion of the land is cultivated; sugar, cotton and vegetables are raised. Earthquakes are frequent but not as destructive as the severe hurricanes, which have several times done a considerable amount of damage in the island. Saint Thomas was once of great commercial importance, its capital Charlotte Amalie was at one time one of the chief emporia of the West Indies. Since the introduction of steam vessels, and especially since 1885, its trade has greatly declined, and Barbados has taken its place as a trade centre. Charlotte Amalie is still of importance as a coaling station, and is a port of call for steamers. The island was first colonized by the Dutch, was held by Great Britain in 1667-71, 1801, and 1807-15, and finally came into the possession of Denmark. In 1870 negotiations were made for its purchase by the United States, but Congress refused to ratify the treaty; it was also included in the treaty of 1902 for the purchase of the Danish West Indies by the United States, which was rejected by the Danish Folkething. Pop. about 12,500. See WEST INDIES, DANISH.

Saint Thomas, Canada, city and county-seat of Elgin County, Ontario; on the Canadian P., Grand T., Michigan Cen., Wabash, and Lake Erie & Detroit River railways; 75 miles southwest of Hamilton, and nine miles north of Port Stanley on Lake Erie. It is one of the most important railway centres in southern Ontario, is the receiving and distributing centre for a rich fruit and farming country, and has an extensive local and export trade. The Michigan Central Railway has large car-building and machine shops here, employing many men, and there are important manufactures of foundry products, farm implements, carriages and wagons, mattresses, brooms, churns, blocks and tackle; flax, flour, and planing mills, and breweries. Saint Thomas has gas, electric lights, and water-works; fine county buildings, city hall, and market; handsome residences, schools, and churches; and hotels, banks, and daily and weekly newspapers. Pop. (1901) 11,485.

SAINT THOMAS—SAINT VINCENT

Saint Thomas (Port. *SAN THOMÉ*, sãn to-mã), West Africa, a volcanic island in the Gulf of Guinea, 170 miles west of the mouth of the Gabun River, belonging to Portugal. It contains an area of 360 square miles, and its highest peak, Saint Anna, rises from the centre of the island to a height of about 7,000 feet. The valleys are fertile but unhealthful; the elevated portions, swept by fresh breezes, are on the contrary, salubrious. The chief products are coffee and cocoa, cotton, sugar, indigo, sweet potatoes, dates, etc. There are large numbers of domestic animals. Saint Thomas, on the northeast coast, is the seat of a bishop, and the chief town. The island was discovered by the Portuguese on Saint Thomas Day, 1471, and was colonized in 1493. The Dutch occupied it from 1641 to 1844. With the island of Principe it forms a province administered by a governor. Pop. of Saint Thomas about 40,000; of Principe, 5,000.

Saint Thomas. See *SÃO THOMÉ*.

Saint Valentine's Day, the 14th of February, so called after a Christian martyr of the Roman period. The custom peculiar to the day of exchanging missives of affection and love, is believed to have been handed down from the Roman festival of the Lupercalia, celebrated in the month of February, when the names of young women were put into a box, and drawn out by men at chance directed. For many centuries, if not up to the present time in certain remote districts, Saint Valentine's Eve was celebrated in a manner very similar to the fashion of Roman heathen times, maids and bachelors throwing billets with their names on into a receptacle, and drawing therefrom by chance the name of some one of the opposite sex, who became thereupon for the year following the "valentine," or chosen companion, of the other more or less lucky individual. The sending of valentines by message or mail is one outgrowth of the custom formerly prevalent. To this has been superadded the sending of cheap and often scurrilous caricatures and verses, to persons whom it is sought to annoy. On the other hand, the custom has expanded in a more pleasant direction in the presentation of affectionate valentines by parents to children, and children to parents, and husbands and wives to each other. In genial climates Valentine's Day is about the mating period of birds, and this is supposed to have had something to do with the origin of the customs with which the day is associated.

Saint-Victor, sãn-vêk-tôr, **Jacques Benjamin Maximilien**, COMTE DE, West Indian author: b. Fort Dauphin, Santo Domingo, 14 Jan. 1770; d. Paris, France, 8 Aug. 1858. He was educated at the College of La Fleche, France, and entered journalism. During Napoleon's reign he was on the staff of 'Journal des Débats' and after 1815 he established several Roman Catholic and royalist magazines. He revisited his native land in 1830, spent two years in the United States and then made a tour of the West Indies. He wrote: 'Tableau historique et pittoresque de Paris depuis les Gaulois jusqu'à nos Jours' (1808-12); 'Lettres sur les Etats-Unis écrites en 1832-3' (2 vols., 1835); 'Journal de Voyage' (2 vols., 1836); etc.

Saint-Victor, **Paul Binsse**, French author: b. Paris 11 July 1825; d. there 9 July 1881. He

first made himself known as a dramatic and art critic, but soon rose to eminence as a student of the drama and of art and a permanent contributor to the literature of these subjects. His best known books are: 'Men and Gods' (1867-72); and 'The Two Masques' (1880-3). He has also written: 'The Women of Goethe' (1869), and 'The Theatre of To-day' (1889).

Saint Vincent, vîn'sënt, **John Jervis**, EARL OF, English naval officer: b. Medford, Staffordshire, 9 Jan. 1734; d. 14 March 1823. He entered the navy as able seaman in 1748-9 and in 1755 was promoted to lieutenant. In the Quebec expedition he led the advance squadron in charge of transports and won the rank of commander. In 1787 he was advanced to rear-admiral and in 1790 was returned to Parliament for Wycombe. He commanded in the naval expedition against the French West Indies in 1793, and two years later was made admiral and given command of the Mediterranean fleet. In the engagement with the Spanish fleet off Cape Saint Vincent, 14 Feb. 1797, he captured four of the enemy's ships and averted the impending invasion of England. For this he was granted a pension and made Earl Saint Vincent. He was 1st lord of the Admiralty 1801-4, and introduced many reformatory measures. He held once more command of the Channel fleet but retired in 1807. At his death the nation raised a statue to him in Saint Paul's cathedral.

Saint Vincent, one of the Windward Islands, British West Indies, lying between Saint Lucia and Grenada; area, 132 square miles. A chain of volcanic mountains traverse the island from north to south, culminating in the volcano of Soufrière in the north (3,000 feet). Many of the valleys are fertile and about one sixth of the total area is under cultivation. Sugar was once the most important product, but the sugar industry has declined, especially since the hurricane of 1898 which destroyed a large number of plantations. The production of arrowroot has correspondingly increased in importance; cocoa, cotton, fruits and vegetables are also raised, and good timber is obtained from the forests. There is a considerable trade, particularly with the United States. The island was discovered by Columbus in 1498, and was then inhabited by Caribs; the Caribs were finally subdued by Great Britain in 1795-6, and transported to Ruatan, in the Bay of Honduras; a few returned to Saint Vincent where a reservation was assigned them. The island is governed by a governor and a legislative council of four official and four nominated unofficial members; before 1877 there was a representative government. In 1812 an eruption of Soufrière devastated a part of the island; and in May 1902 occurred another eruption, contemporaneous with that of Mont Pelée (q.v.). Premonitory signs of eruption were given as early as February 1901, and these warnings increased as soon as Mont Pelée began to be active; the eruption commenced on 6 May, with a burst of smoke, followed by flames; it ceased for a time the next morning, but reached its full force in the afternoon of that day (7 May). Sounds resembling heavy cannonading were heard at sea for 400 miles; and ashes fell in Barbados, 100 miles distant. Several large plantations were destroyed, and about 1,600 persons killed.

SAINT VINCENT DE PAUL — SAINTES

Saint Vincent de Paul. See VINCENT DE PAUL, SAINT.

Saint Vincent de Paul, Society of. See SOCIETY OF SAINT VINCENT DE PAUL.

Saint Vitus' Dance. See CHOREA.

Sainte Anne de Beaupré, *sânt ân dè bô-prâ*, Canada, a village of Montmorency County, Quebec, at the mouth of the Sainte Anne River, on the north shore of the Saint Lawrence River, 25 miles by rail northeast of Quebec. The fine modern basilica and the ancient parish church, containing relics of Sainte Anne, are visited annually on the saint's feast day, 26 July, by thousands of pilgrims. Sainte Anne is also a favorite summer resort. Pop. about 500.

Sainte-Beuve, *sânt bèv*, **Charles Augustin**, French literary critic: b. Boulogne-sur-Mer 23 Dec. 1804; d. Paris 13 Oct. 1869. He was educated at a school in his native town, and from 1818 at the Collège Charlemagne and the Collège Bourbon in Paris. He studied the physical and natural sciences under Lamarck and Magendie, and in 1823 entered the school of medicine. In 1824 he became a contributor to the 'Globe,' a liberal and philosophical journal. A review of Victor Hugo's 'Odes' contributed in 1827 gained him the friendship of the poet, and thenceforward he identified himself with the romantic movement. In 1829 appeared his novel, 'Vie, Poesies, et Pensées de Joseph Delorme'; and in 1830 he dedicated a volume of poems, 'Consolations,' to Victor Hugo. About this period he was associated with the Saint Simonians, and afterward with Lamennais, but soon broke with them and also with Hugo and the romanticists. His novel 'Volupté' (1834) essentially autobiographical, may be regarded as marking this turning-point in his career, but 'Pensées d'Août' (1837), a volume of poems, is still colored by his religiosity. His next and greatest work, 'Port Royal,' is a history of Jansenism. He was admitted a member of the French Academy in 1844, and four years later accepted a professorial chair at Liège. His lectures there formed the basis of his next work, 'Châteaubriand et son Groupe Littéraire sous l'Empire' (1860). He eagerly welcomed the *coup d'état* and finding it impossible under the Second Empire to secure a hearing at the Collège de France, where he was professor, published his undelivered lectures in a volume entitled 'Etude sur Virgile' (1857). In 1865 he was appointed a senator, and regained popularity by his defense of freedom of thought and speech. In 1849 he began the series of Monday critical articles on literary subjects which has gained him a European reputation. These articles were published in two series, 'Causeries du Lundi' (1851-62); and 'Nouveaux Lundis' (1863-72). Among his other works are: 'Portraits de Femmes' (1844); 'Portraits Littéraires' 'Portraits Contemporains' (1846); 'De la Liberté de l'Enseignement' (1868); 'P. J. Proudhon, sa Vie et sa Correspondance' (1872); 'Lettres à la Princesse' (1873, being letters to Mathilde, sister of Napoleon III.); 'Chroniques Parisiennes' (1876); 'Correspondance' (1877-8); 'Nouvelle Correspondance' (1880); 'Le Clou d'Or' (1880); 'La Pendule' (1880); and 'Lettres au Professeur Gaulle' (1895). Consult: D'Haussonville, 'Sainte-Beuve, sa Vie et ses Œuvres' (1875); Pons, 'Sainte-Beuve et

ses Inconnues' (1879); Troubat, 'Souvenirs du dernier Secrétaire de Sainte-Beuve' (1890); Vattier, 'Sainte-Beuve' (1892); Fisher, 'A Group of French Critics' (1897); Brunetière, 'Evolution des Genres,' Vol. I. (1899).

Sainte Chapelle, Paris, one of the most interesting of the old architectural monuments of the French capital. It stands entire inside the Palais de Justice, in the large court to the left of the main entrance from the Boulevard du Palais. It was built in 1245-8, during the reign of Saint Louis, as the chapel of the royal palace, a few other remnants of which now form parts of the Palais de Justice. The main body (115 feet long and 36 feet wide) is a Gothic nave almost perfect in style. The upper chapel, used by the royal family, has an exquisite interior, and almost the entire wall-space is occupied by 15 large windows of stained glass set in beautiful tracery. Services are held in the chapel once a year at the opening of the courts.

Saint-Claire-Deville, Henri Etienne, *sh-rê â-tê-ên sânt klâr dè-vêl*, French chemist: b. St. Thomas, W. I., 11 March 1818; d. Paris 1 July 1881. In 1844 he organized the Faculty of Sciences at Besançon, becoming himself professor of chemistry and dean, and in 1851 professor of chemistry in the Normal School at Paris. Shortly afterward he assumed a similar chair at the Sorbonne. He first produced aluminum (1855) and platinum in commercial quantities. He discovered anhydrous nitric acid in 1849; devised methods for fusing platinum, iridium, cobalt, etc.; determined the density of metallic vapors at exceedingly high temperatures. Many of his papers appeared in 'Comptes rendus de l'Académie des Sciences de Paris,' and in the 'Annales de Chimie et de Physique.' He published 'De l'Aluminium, ses Propriétés, sa Fabrication' (1859), and 'Metallurgie du Platine et des Métoux qui l'accompagnent' (1863).

Sainte Croix, *kroi*, an island of the Danish West Indies. See SANTA CRUZ.

Sainte Cunégonde, *kû'nê-gond*, Canada, a city of Hochelaga County, Quebec, two miles distant from Montreal, of which it is a suburb. It has many handsome residences, churches, and schools, and some manufactures. Pop. about 12,000.

Sainte Genevieve, *sânt jên'e-vêv*, Mo., city, county-seat of Sainte Genevieve County; on the Mississippi River; 46 miles south of Saint Louis. It was first settled by the French in 1735, being the oldest settlement in the State. The site of this original settlement was about three miles south of the present site, but a severe flood in 1785 caused the colonists to move to higher ground. In 1810 it had a number of large stores and was the place from which Saint Louis obtained supplies. It is situated in an agricultural and stock-raising region; there are limestone quarries and copper mines in the vicinity, and the city contains several lime kilns and flour mills; fruit-growing and wine-making are also important industries. It is the seat of a Roman Catholic convent and academy. Pop. (1910) 2,000.

Saintes, *sânt*, France, in the department of Charente-Inférieure, 28 miles southeast of Rochefort, occupies a picturesque slope overlooking

the Charente, which is crossed at this point by a bridge formerly supporting the ancient triumphal arch of Germanicus. Among other interesting Roman antiquities are the ruins of an amphitheatre, which is only surpassed by the Colosseum of Rome. In the Antiquarian Museums are preserved 7,000 medals and many pieces of sculpture. Saintes was once a bishop's see; the ancient cathedral, still standing, was nearly destroyed (1568) by the Huguenots. There are other ancient churches, of which Notre Dame is a fine example of architecture of the 11th and 12th centuries. The other public buildings are a communal college, courthouse, library and theatre. There are manufactures of iron, copper, woolen and cotton goods, pottery, casks and leather. Trade is in wheat, corn, brandy, timber, etc. Saintes was the ancient capital of the Santones, and later, of the province of Saintonge. Pop. about 20,000.

Saintin, sǎn-tǎn, Jules Emile, French painter: b. Lemé, Aisne, France, 14 April 1829; d. Paris 14 July 1894. He studied under Drölling, Picot and Leboucher and won several medals in the Salon and a third-class medal at the Paris Exposition of 1889. Several years of his life were spent in the United States where he painted some fine portraits and several genres such as 'The Pony Express' (1863) and 'Abandoned' (1880). Among his American portraits is that of Stephen A. Douglas (1860). His work as a portrait painter is correct and academic, and most of his genre pictures derive their main interest from the subjects they represent, not from any inherent distinction of style or handling.

Saintine, sǎn-tên, pseudonym of JOSEPH XAVIER BONIFACE, French novelist, poet, and dramatist: b. Paris, France, 10 July 1798; d. there 21 Jan. 1865. He wrote about 200 plays, a volume of poetry, and several philosophical stories. His best known work is 'Picciola' (q.v.) (1837), which received the Montyon prize, ran through 40 editions and was translated into several languages. He published a series of stories entitled: 'Jonathan, the Visionary' (1827); 'History of the Wars in Italy'; etc.

Saints' Days are days set apart by the Roman Catholic Church for religious services in honor of particular saints, after whom the days are named in the calendar. The celebrations differ in different countries, and according to the relation of the name of a particular saint to a particular locality. In the United States and Great Britain such celebrations take the form of religious services held in churches. In continental Europe and in South America saints' days often take the form of great municipal or even national celebrations. In Sweden, which is Lutheran as to state religion, it is customary to celebrate what is known as the name-day, or day of the saint after whom a person is named, in a similar manner to a birthday.

Saints' Everlasting Rest, The, a devotional work published by Richard Baxter (q.v.) in 1650. By its deep piety, and its style of dignified eloquence, hardly a word of which has grown obsolete, it has taken a place with the 'Pilgrim's Progress' in the literary treasures of English Nonconformity. Consult French, 'Baxter and the Saints' Rest' (1877).

Saintsbury, sǎnts'bū-rī, George Edward Bateman, English literary critic: b. Southampton 23 Oct. 1845. He was educated at Oxford, was senior classical master in Elizabeth College, Guernsey, 1868, when he became headmaster of Elgin Educational Institute 1874-6. From 1875 to 1895 he was engaged in journalistic and literary work in London, and in the last named year became professor of English literature in Edinburgh University. He holds a leading place among contemporary English critics and among his many published works are: 'Primer of French Literature' (1880); 'Dryden' (1881); 'Short History of French Literature' (1882); 'Manchester' (1887); 'History of Elizabethan Literature' (1887); 'Essays in English Literature 1780-1860' (1890); 'Essays on French Novelists' (1891); 'Miscellaneous Essays' (1892); 'The Earl of Derby'; 'Corrected Impressions' (1895); '19th Century Literature' (1896); 'The Flourishing of Romance and the Rise of Allegory' (1897); 'Sir Walter Scott' (1897); 'A Short History of English Literature' (1898); 'Matthew Arnold' (1899); 'A History of Criticism' (Vol. I., 1900); and 'The Earlier Renaissance' (1901).

Sais, sǎ'is, Egypt, in hieroglyphics SA, a ruined city on the Rosetta branch of the Nile, 67 miles northwest of Cairo. It was an ancient religious capital, whose famous temple of the goddess of Neith contained the mysterious veiled statue, the subject of Schiller's ballad and of Novalis' romance. In Sais the fête of burning lamps was celebrated, attracting many foreigners; and here was a tomb of Osiris. Sais was also a renowned educational centre frequented by the Greek sages. It gave its name to two Egyptian dynasties, founded by natives of the city. The Saiti kings ruled Egypt for 150 years, until the country was invaded by the Persians under Cambyses.

Saivas, si'vaz, one of the three great divisions of the Hindu religion, and meaning the worshippers of Siva. These are separated into sects which have varied in number at different periods in the religious history of Hindustan.

Sajou', same as SAPAJOU (q.v.).

Sajous', Charles Euchariste de' Medici, American physician: b. at sea off coast of France, 13 Dec. 1852. He was graduated from Jefferson Medical College, Philadelphia, in 1878, and was clinical lecturer there 1884-90. He has edited 'Sajous' Annual of Universal Medical Sciences' (45 vols., 1888-96); and written 'The Internal Secretions and Principles of Medicine' (1903); 'Diseases of the Nose and Throat' (1885); 'Curative Treatment of Hay Fever' (1884).

Sakai, sǎ'ki, Japan, on the southwest of the island of Hondo, seven miles south of Oskā. Before the rise of the latter town it was the chief commercial port of Japan. Osaka now monopolizes the trade. Pop. about 55,000.

Sakhalin, sǎ-gǎ-lén', or Saghalien (properly Karafutu), Siberia, a long mountainous island in the North Pacific, opposite the mouth of the Amur. Its area contains 24,560 square miles. The Strait of La Pérouse separates it on the south from Yezo, Japan, and the Sea of Okhotsk bounds its eastern and northern shores.

The narrow and shallow Strait of Tartary separates it from the mainland. Mounts Béruijet and Któns-pal (2,000 to 5,000 feet) are the highest points of mountain ranges extending from north to south, and interspersed with valleys of varying width. The principal rivers are the Tym and the Poronai, navigable for a short distance and teeming with fish, especially salmon. Petroleum and naphtha exist, and coal is mined by Russian convicts. Agriculture does not succeed owing to the extremely rigorous climate. The island is covered with dense forests. Bears, tigers, sables, and wild reindeer abound. Vegetation is Siberian in character. Sakhalin's history begins with the Stone Age, relics of which and of the Bronze Age are still extant, as seen in houses, bones, and implements discovered. The island formerly belonged to the Chinese empire, but early in the 19th century it was annexed by the Japanese who ceded it to Russia in 1875. Russia has attempted to colonize the island by convicts; some 4,000 to 5,000 of them now work the coal mines. Other inhabitants are Aimos, the aborigines, a primitive and peculiar race; — Gilyaks, Oroks, and Japanese, who live by hunting and fishing. Otarcas, seals and dolphins are a source of profit. Alexandrovsk is the chief seaport.

Sakhara, sāk-kā'rā, Egypt, the necropolis of Memphis, about two miles distant from the ruins of the ancient city on the confines of the Libyan Desert. The chief interest lies in its antiquities, tombs and catacombs. Many pyramids rise among its ruins, one of which is remarkable for its doorway of inlaid tiles, and as bearing a royal name. Mariette discovered numberless sarcophagi, catacombs of the sacred Ibis, tombs of the god Apis, numerous grottoes, etc.

Sak'i, a South American monkey of the genera *Brachyurus*, *Pithecia* and related groups. The term is rather indefinite. See MONKEY.

Saki, sāk'kō, or **Sake**, the native beer and common stimulating drink of the Japanese. It is made from rice, and is drunk warm, producing a very speedy but transient intoxication.

Sakieh, sāk'ē, **Sakia**, or **Sakeeyeh**, a machine used in Egypt for raising water from the Nile for the purpose of irrigation. It consists of a series of cogged wheels, turned by a buffalo or camel, each revolution of the wheel working up a series of earthen pitchers which empty themselves into a trough or pool.

Sakta, sāk'ta, the designation in the Hindu religion of a worshipper of the Sakti, the power or energy of the divine nature personified in a female form. If the tendencies of the worshipper are toward the adoration of Vishnu, then the personified Sakti is termed Lakshmi or Mahalakshmi; if it be toward that of Siva, the Sakti is denominated Parvati Bhavani, or Durga. At least three fourths of the Hindus of Bengal are of this sect, and of the remaining fourth, three are Vaishnavas to one Saiva. Wilson divides the Saktas into Dakshinis, Vamis, Kanchelias, and Kararis. Another classification is into the Dakschinacharis and the Vamacharis, followers of the Right Hand and of the Left Hand Ritual.

Sakuntala, the most famous drama of the Sanskrit poet Kalidasa (q.v.). The fable of the play is as follows: King Dushyanta while on a hunting expedition falls in love with the

hermit maiden Sakuntala. He is espoused to her, and departs from the hermitage to the royal city, leaving with Sakuntala a ring which she is to present in claiming him as her lawful husband. But through the curse of an aged hermit whom the maiden has offended, Dushyanta loses all recollection of Sakuntala, and is to remain unmindful of her until he catch sight of the magic ring. Her hermit father meanwhile is anxious that the royal child who is to be born of her shall first see light in the palace of her husband and hurries with her to the royal city where she finds that she has lost the ring and is repudiated and repulsed by the King, and carried off by a whirlwind to a remote mountain. There she gives birth to a son. The ring had dropped into a sacred pool, and comes to light through the agency of a fish; whereupon Dushyanta remembers his marriage and seeks to recover his wife. Some years afterward Indra transports him to the far off mountain retreat of Sakuntala where the union of the separated pair is beautifully described. The drama is full of natural feeling, and vivid description and the action is strong and interesting. (See SANSKRIT LANGUAGE AND LITERATURE.) Consult the translations (with introduction) of Sakuntala by Monier Williams, Edgren, Jones, and Jackson.

Sal-ammoniac. See AMMONIA.

Sal-tree, a valuable timber-tree of India (*Shorea robusta*) second in importance only to the teak. It is found in large forests along the base of the Himalayas and again in another belt in eastern India. It belongs to the order *Dipterocarpaceae*, and yields a hard, heavy dark-brown, close-grained wood which is very durable, and highly valued, particularly for gun-carriages and railway ties. A whitish aromatic resin (sal-dammar) used to calk ships and also for incense (see DAMMAR) is obtained by tapping the trunk. The tusser silkworm feeds on the leaves. The sal forests are protected by the government of India.

Sala, sāl'la, George Augustus Henry, English journalist and author: b. London 24 Nov. 1828; d. Brighton, Sussex, 8 Dec. 1895. He received some instruction in drawing, but at 15 was obliged to provide for himself. He was a theatrical scene painter for a time, then turned to etching and engraving and had some success as an illustrator. In 1848 he turned to literature and from 1851 to 1856 contributed regularly to 'Household Words,' edited by Charles Dickens. His first experience as "special correspondent" was in the letters he wrote for this journal from Russia after the Crimean war. In 1863-4 he was in the United States reporting the Civil War for the *Daily Telegraph*, and later published 'My Diary in America in the Midst of the War.' He followed Napoleon III. to Algiers and published as a result, 'A Trip to Barbary by a Roundabout Route' (1866). He established 'Temple Bar,' a periodical which he edited from 1860 to 1866 and derived a large income from journalism, but much of his work is cheap and inflated, and no doubt was an important factor in the development of modern reprehensible newspaper methods. He wrote a critical biography of William Hogarth (1860); and, in addition to works of travel already mentioned, 'America Revisited' (1882); 'A Journey due South' (1885); 'Right Round the World' (1888),

works embodying his observations as a tourist and lecturer across the American continent to Australia and India.

Salaam, *sa-lām'*, or **Peace Be With You**, the common salutation among Mohammedans. The answer is, "On you be peace and the mercy of God and his blessings." It is improper to address this answer to any but a believer.

Salad Plants, various herbs whose tender, succulent foliage is eaten raw, with or without a dressing. In general, salads should be grown quickly and served as soon as possible after being gathered. They all delight in moist, rich soil with abundance of humus and nitrogenous plant food. Most of them may be sown as soon as the soil can be worked in spring, and some may be sown in autumn and allowed to remain until spring. Few do well in hot weather. Clean cultivation is essential with all of them, and since they are usually quick growing plants, they are favorites for growing between the rows of later maturing plants, such as cabbage, peas, beets, etc., which are themselves used by market-gardeners in the same way, a later crop being put upon the land as soon as they are gathered. That is, a crop of salads, one of cabbage and one of perhaps celery may be obtained from the same area in one season.

In America the most important salad is lettuce, which is extensively grown by truckers and market gardeners, especially in the east from Florida to Massachusetts, the season starting in January in the south and advancing northward until June, the hot weather checking its production. In the autumn there is a less marked southerly migration. In the north large quantities are also grown under glass to supply local demands. Probably the endive ranks second as a market salad. Its consumption is, however, far less than that of lettuce, and it is less cultivated in the south than in the north, where the cooler climate is more suitable. As a home-salad mustard and cress are probably of next importance in America; in Europe they are grown in enormous quantities for the general market, but in America they are seldom offered for sale. Watercress is more important as a market salad and probably ranks next to endive. It is grown in streams or in damp ground, immense quantities being shipped to the eastern markets from Virginia. Chicory and dandelion are both popular in the east, but probably more as pot-herbs than as salads. They usually require longer to attain edible size than lettuce and like endive are generally blanched. Chicory is occasionally used in the United States to make *barbe de capucin* and *witloof*, two salads very popular in Europe. The roots are dug in autumn, trimmed and for the former laid horizontally in pyramidal heaps with alternate layers of sand or soil in dark cellars and kept moist by occasional watering; for the second they are buried vertically and covered with some fermenting material for a few weeks. The former is the succulent leaf produced; the latter is a small head something like Brussels sprouts. Either may be used as salad or as pot-herb.

Saladin, *sāl'a-dīn*, or properly **Salah-ed-Din Yussuf Ibn-Ayud**, sultan of Egypt and Syria: b. Tekrit 1137; d. Damascus 3 March 1193. He entered the service of Nureddin, emir

of Syria; became vizier in Egypt about 1169; suppressed the Fatimites in 1171; was proclaimed sultan in 1174; and conquered Damascus and Syria. The great object of his policy was to expel the Christians from Palestine, and recover the city of Jerusalem (see **CRUSADES**). An atrocious massacre of Mohammedan pilgrims by Chatillon added to his ardor; and his vow of revenge against the perpetrator he was enabled to make good by his famous victory on the Plain of Tiberias in 1187, where he captured Guy de Lusignan, king of Jerusalem, Chatillon (whom he cut down after the battle with his own scimitar), and many more. The fruits of this victory was the towns of Acre, Said, and Beyrout; after which he laid siege to Jerusalem, which yielded (1187) in a capitulation, to the articles of which Saladin faithfully adhered. He then proceeded against Tyre, but failed in consequence of the destruction of his fleet by the Franks. The intelligence of the loss of Jerusalem reaching Europe produced the crusade under the Emperor Frederick Barbarossa (q.v.), whose death inspired Saladin with hopes soon damped by the arrival of the forces of Richard Cœur-de-Lion of England, and of Philip Augustus of France. The recovery of Acre by the two kings took place in 1191, upon which event Philip returned to France, and Richard, after twice defeating the sultan, took Caesarea and Jaffa, and spread alarm as far as Jerusalem. At length a truce was concluded between Richard and Saladin (1192), by the terms of which the coast from Jaffa to Tyre was ceded to the Christians, while the rest of Palestine remained to the sultan. The departure of Richard freed Saladin from his most formidable foe. Though chargeable with unjustifiable means of acquiring power, Saladin employed it, when obtained, usefully for his subjects, whose burdens he lightened, while he benefited them by many useful works and establishments. Magnificent in his public undertakings, he was frugal in his personal expenses. He has been celebrated in Western literature for courage, moderation, and justice. Scott introduces him into 'The Talisman,' disguised as the physician Adonbec and as Ilderim. Consult: Reinaud, 'Notice sur la Vie de Saladin' (1874); Baha-ed-din, 'The Life of Saladin' (1897); Lane-Pool, 'Saladin, and the Fall of the Kingdom of Jerusalem' (1898).

Salado, *sā-lā'thō*, a river of Argentina, rising in the eastern slopes of the Cordilleras, and emptying into the Paraná after a course of 750 miles. It is salty, hence the name.

Sal'al, an evergreen shrub (*Gaultheria shallon*), of the northwestern United States, from 2 to 10 feet high, with dark-green leaves and reddish twigs, bearing racemes of flowers, succeeded in August by dark-purple fruit, "salaberries," of the size of buck-shot, rough on the outside, very juicy and of a sub-acid flavor.

Sal'aman, **Malcolm Charles**, English author: b. London, 6 Sept. 1855. He was educated at Owens College, Manchester and at first studied mechanical engineering. He then turned to journalism and especially to dramatic and art criticism. He was dramatic critic of the London 'Sunday Times' 1883-94, and was on the staff of the London *Daily Graphic* 1890-1900. He has published several volumes of verse and sev-

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eral popular farces and comediettas such as 'Boycotted'; 'Both Sides of the Question'; 'A Modern Eve' (1894).

Salamanca, Mexico, a town in the State of Guanajuato, situated in the southwestern corner of the state, on the railroad to Guadalajara. It lies in a wide, fertile, but somewhat marshy plain. Among its seven churches one is a gothic structure built on an ambitious plan. The chief industry of the town is the manufacture of porcelain.

Salamanca, sāl-a-măn'ka, N. Y., village in Cattaraugus County, on the Allegheny River, and on the Lake Erie & Western, the Buffalo, Rochester & Western, and the Western New York & Pennsylvania R.R.'s; 54 miles south of Buffalo. It was incorporated as a village in 1878. The lumber business is the chief industry, and there are several saw and planing mills; the village also has a tannery, wire-mattress factory, cigar factories, an embroidery factory, and railroad machine shops. It contains two national banks with a combined capital of \$100,000. It has both natural gas and electric light plants, and a gravity system of waterworks. The town has a public high school, established in 1881, with a school library of over 3,000 volumes (1904); and a Roman Catholic parish school. Pop. (1910) 5,792.

Salamanca, sã-lã-măn'kã, Spain, (1) capital of a province of the same name, in Old Castile, 120 miles northwest of Madrid, occupying three hills on the right bank of the River Tormes. Its numerous and magnificent ecclesiastical and educational institutions have secured for Salamanca the title of 'Little Rome.' On the great plaza are the town-house, post-office and stores. The Plaza Mayor is one of the finest squares in Europe, and is surrounded by an arcade supported by 90 Corinthian columns. The cathedral, begun in 1513, is a fine example of the florid gothic, with an elaborate portal, lofty dome, and graceful interior columns. There are also an old and massive cathedral of Norman-French style (1102), numerous other churches, and as many convents; the College of St. Bartholomew or Old College (1410), a classic building with an Ionic portico; College of Jesuits; that of the military order of Calatrava, College of the Archbishop (1522, by Fonseca), a colossal and sumptuous edifice with a fine façade and a chapel containing sculptures by Michelangelo; and Saint Domingo, the largest convent. The University of Salamanca is one of the most venerable and celebrated in Europe (13th century), whose students once numbered 14,000, coming from all parts of the globe. The cloisters of the two buildings comprised in the university are remarkably elegant, with graceful arches and elaborate moldings. There are numerous other schools, a theatre, bull arena, asylums, hospitals, handsome residences and palaces, etc. The most distinguished of the latter are the palaces of the Marquis of Valdecarzana, and of the counts Garcigrande, Maldenadas, Espinosas and Monterey. There is an electric-light plant and manufactures of leather, blankets, hats and pottery. Salamantica (its ancient name) was an important city of the Vettones. In 222 B.C. it was taken by Hannibal, and later under the Goths was a favored city. It was ravaged by the Moors and retaken in 1095. Columbus was

lodged (1484-6) in the Dominican convent. In 1543 Philip II. was married to Mary of Portugal. In 1812, the Duke of Wellington gained a victory over the French under Marmont. Pop. about 32,000.

(2) The province of Salamanca contains 4,940 square miles, the greater part of which is covered by forests of oak and chestnut. The principal rivers are the Tormes, Douro, Yeltes, Agueda and the Alagon. There are good harvests of cereals, hemp, oil, and wine. Gold is found in the streams, and iron, lead, copper, zinc, and coal in the hills, but the mines are only partially developed, partly due to the difficulties of transportation. The manufactures are unimportant and mainly for home consumption. The cloth of Bejar is especially good. Tanning of hides is a considerable industry. The province is traversed by a railway to Portugal. Besides the capital, the only other cities are Bejar and Ciudad Rodrigo.

Sal'amander, the name applied generally to the species of tailed Amphibians (*Urodela*), but originally to the common European genus *Salamandra*. The smaller strictly aquatic species are known as newts (q.v.) or tritons; some of the larger species have received special names, as Kongo-snake, hellbender, Siren and water-dog (qq.v.). The remaining salamanders are terrestrial or semi-aquatic and only rarely remain permanently in the water. One Californian species (*Ambystoma tigrinum*) is partly arboreal. They are of small size and lizard-like form; but the popular notion that they are lizards is altogether erroneous, as they are strictly batrachian in structure and life-history. The skin is smooth, glandular and scaleless, the skull possesses a well-developed parasphenoid bone and two occipital condyles, and all, except a few terrestrial species, pass through an aquatic gill-breathing stage. Some of the larger aquatic species advance but little beyond this condition; but in the great majority it is larval only and is succeeded by an abranchiate and sexually mature state. The axolotl (q.v.) of the genus *Ambystoma*, is a remarkable instance of a sexually mature larva. Many adult salamanders breathe by means of lungs, but a recent noteworthy discovery is the total absence of lungs in a large proportion of species, in which respiration takes place partly in the skin, but especially by means of a special vascular area of the pharynx. Most of the species deposit their large eggs in water, sometimes in a mass of jelly, as *Ambystoma* (q.v.), sometimes separately or in strings, as *Spelerpes*; but others, like *Desmognathus fusca* and *Plethodon*, seek drier places beneath stones and guard the eggs, and the terrestrial salamanders of Europe (*Salamandra*) are ovoviviparous. All are carnivorous and subsist upon insects, worms, etc. They are chiefly active at night, and during the day conceal themselves beneath stones and logs. During cold weather they pass into a more or less profound state of hibernation. Owing to the numerous cutaneous glands the skin is always moist and cold, from which arose the remarkable superstition that these animals, which, as a matter of fact, require abundant moisture to sustain life, have the power not only of resisting, but of quenching, fire. From this the name is applied to many articles, and

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by the ancients to a mythical creature, having fire-resisting qualities. The cutaneous secretion is poisonous to many of the lower animals. For a classification of salamanders see *URODELA*; for development see *EMBRYOLOGY*. Consult Cope, 'Batrachia of North America' (Washington, 1889); Gadow, 'Amphibia and Reptiles' (New York, 1901).

Salamander, a kind of gopher (q.v.).

Salam'ba, the native Filipino name for a kind of fishing apparatus, used near Manila, fitted on a raft composed of several tiers of bamboos. It consists of a rectangular net, two corners of which are attached to the upper extremities of two long bamboos, tied crosswise, their lower extremities being fastened to a bar on the raft, which acts as a hinge; a movable pole, arranged with a counterpoise as a sort of crane, supports the bamboos at the point of junction, and thus enables the fishermen to raise or depress the net at pleasure. The lower extremities of the net are guided by a cord, which, being drawn toward the raft at the same time that the long bamboos are elevated by the crane and counterpoise, only a small portion of the net remains in the water, and is easily cleared of its contents by means of a landing net.

Salamis, *sāl'a-mīs*, or **Koluri**, an island off the coast of Greece, in the Saronic Gulf, about 10 miles east of Athens. It covers an area of about 30 square miles; is of irregular shape and rocky surface, and separated from the mainland by narrow, winding channels, giving access to the beautiful Bay of Eleusis, which has the appearance of a lake. Its soil is well adapted to the olive, and vineyards thrive. The other chief product is honey. The old city of Salamis stood on the south coast, and the famous naval battle of 480 B.C., between the Greeks and Persians, soon after the great battle of Thermopylae, was fought in the narrow eastern strait. The principal town is Koluri.

Salamambo, *sā-lām-bō'*, a historical romance by Gustave Flaubert, published in 1864. It resulted from the author's visit to the ruins of old Carthage, and is a kind of revivification of the ancient capital and its people. The scenes testify to the great erudition of the author, but critics complain that the picture has too little perspective. All is painted with equal brilliance—matter essential and unessential.

Sal'angane, a swift (*Collocalia fuciphaga*) of the Mayalan Archipelago, famous as the producer of the edible birds' nests. See *BIRDS' NESTS*, *EDIBLE*.

Salary Grab, in American history, the popular name for the general increase in Federal salaries in 1873. The Constitution provides for the compensation of the President, senators, representatives, justices and Federal officers from the Federal treasury. The Act of 3 March 1873 provided that the President's salary be increased from \$25,000 to \$50,000, that of the chief justice from \$8,500 to \$10,500, those of the Vice-President, cabinet officers, associate justices and speaker of the house from \$8,000 to \$10,000, and of senators and representatives from \$5,000 to \$7,500. Another act, 4 March 1873, was retroactive as regarded the salaries of members of Congress during the previous two years. This, the

essence of the 'salary grab,' excited so much indignation that the laws were repealed, except those affecting the salaries of the President and justices.

Salawatti, *sā-lā-wā'tē*, a Melanesian island off the western coast of New Guinea, covering an area of about 750 square miles. A chain of chalk cliffs, rising to a height of 2,500 feet, skirts the northern coast; the remaining portion is a deep valley covered with virgin forests. Salawatti was discovered by Watson in 1764. It is regarded as belonging to Dutch New Guinea. Pop. (est.) 5,000 to 6,000.

Salayer, or **Saley**, *Islands*, East Indies, a small group of islands off the southern coast of Celebes, from which they are separated by the strait of Salayer, 13 miles wide. These islands form a part of the Dutch province of Macassar, the greatest native mart of the archipelago, in the trade passing east as far as and including New Guinea — tortoise shell, pearl shell, spices, birds-of-paradise skins, and *bêche-de-mer*. The principal island of the group is Salayer, or Great Salayer, about 30 miles long by 8 miles broad. Pop. of group, 60,000.

Saldanha (*sāl-dā'nā*) Bay, South Africa, on the west coast of Cape Colony, 80 miles north of Cape Town, is a minor commercial port on the Atlantic, for the western provinces of South Africa. It is chiefly of service in the coast trade, and of all the harbors of this seaboard is the only one affording shelter and anchorage at all seasons. It was formerly the chief Dutch naval station in South Africa.

Sale, George, English Oriental scholar: b. about 1680; d. London 13 Nov. 1736. Little is known of his life except that he was a solicitor in London, and at an early period turned his attention to the study of Arabic and other Oriental languages. In 1726 he began the publication of an Arabic translation of the New Testament for the Society for the Promotion of Christian Knowledge, and was for years engaged in the work of that association. He is best known by his admirable translation of the Koran in 1734, still highly esteemed. Consult Davenport, 'Sketch of the Life of George Sale.'

Sale, Sir Robert Henry, English military officer: b. Buckden, Huntingdonshire, 19 Sept. 1782; d. Mudki, India, 21 Dec. 1845. He entered the army with an ensign's commission in 1795, was promoted lieutenant in 1797, and in 1798 was ordered to India. He was engaged at Seringapatam, and in 1810 took part in the expedition against Mauritius. In 1813 he was promoted major, and in 1815 he returned to England with his regiment. He served in the expedition against Burma in 1824; in 1838 became brevet-colonel and was placed in command of a brigade in the army of the Indus. In the war with Afghanistan which followed Sale played an important part. He became major-general in 1840; was in command of the army which stormed Khurd Kabul Pass in 1841 and defended Jelalabad in the siege of 1841-2. He was knighted for his conduct at Kabul, received the thanks of Parliament for his services in the war, and was promoted colonel of his regiment. In the Sikh war he was wounded at the battle of Mudki, 18 Dec. 1845, and died three days later.

SALE—SALEM

Sale, in law, is an agreement by which one of the contracting parties, called the seller, gives a thing, and passes the title to it, in exchange for a certain price in current money. It differs from a barter and exchange in that, in the latter the consideration instead of being paid in money consists of goods or merchandise susceptible of a valuation. Sale is often applied to a transfer for a consideration of either real or personal property, but in its technical sense, it applies to personal property, as the transfer of real property is effected under a conveyance. Good faith is essential to the validity of a sale, and fraud in relation thereto will vitiate the contract. A sale is not valid if the subject thereof is illegal and prohibited by law, or if the transaction involves an illegal act. To constitute a valid sale there must be proper parties; a thing which is the subject of the transaction; an agreed price; the consent of the parties and some performance by them, such as the payment or delivery which is required to complete the contract. The thing or object which is sold must actually exist at the time of the sale, otherwise the sale is invalid, and if only a part of the subject of the sale exists or is destroyed before the sale is completed, it is optional with the buyer to rescind or enforce his contract. A conditional sale is one where some particular act agreed upon by the parties remains to be done in order to complete the sale. In most of the jurisdictions of the United States statutes have been enacted which require that contracts for the sale of certain goods must be in writing, in order to bind the parties thereto. One who by his acts approves of what has been done, such as knowingly using goods which have been left at his house by another who intended to sell them, is held to have confirmed the sale. Both parties to a sale must agree as to the terms, in order to make the contract binding.

Salem, sālēm, Iff., city, county-seat of Marion County; on the Baltimore & O. S. W. and Chicago & E. I. R.R.'s; 97 miles southeast of Springfield. It is in an agricultural and coal-mining region; its chief industry is the culture, evaporation, and shipment of fruit. It has also several flour mills. It contains a public high school, founded in 1870. Pop. (1890) 1,975; (1900) 1,995; (1910) 2,210.

Salem, India, (1) chief town of a district of the same name, on the river Tirumanimuttar, 207 miles southwest of Madras. It is well-built, but unhealthy, being located in a narrow valley, and subject to sudden and frequent changes of temperature. There is a large weaving industry, some cutlery. There is a municipal college, three printing presses, four reading-rooms, and an English mission. Pop. about 73,000. (2) The district embraces 7,529 square miles and is very hilly, intersected by broad plains. The principal rivers are the Cauvery with its numerous tributaries. The forests are valuable, magnetic iron ore abundant, corundum and chromate of iron deposits. The chief crops are millet, grain, rice, ragi, oil seeds, and some cotton, indigo, coffee and tobacco. Much of the area is irrigated.

Salem, Mass., city, one of the county-seats of Essex County; on a peninsula formed by

two inlets of the Atlantic, known as North River and South River, and on the Boston & Maine railroad; 14 miles northeast of Boston. It was founded in 1626 by Roger Conant, and chartered by John Endicott in 1628. The Church was organized 6 Aug. 1629 with Samuel Skelton and Francis Higginson as pastor and teacher. In 1633 Roger Williams was pastor of the church here, but was driven out in 1636. In 1692 the witchcraft delusion broke out, and 19 persons were hanged as witches on Gallows Hill, while Giles Cory was pressed to death for refusing to plead, the only instance on record in America under the English statute. (See *WITCHCRAFT*.) In 1774 the first provincial assembly was held here and declared for the independence of the Massachusetts colony; and in 1775 the British under Capt. Leslie were prevented from crossing the North Bridge in their search for arms and ammunition. Salem furnished over 150 armed privateers during the Revolution. It was incorporated as a city in 1836, and furnished a large quota of troops during the Civil War. It was the birthplace, and for a time the residence of Nathaniel Hawthorne. Before the War of 1812 Salem had practically a monopoly of the East Indian and China trade; since then the foreign commerce has gradually been transferred to Boston and other ports, but there is an important coasting trade in coal, large quantities of which are landed here for transportation to inland towns. The manufacturing industries are also of importance; they include a large cotton mill, tanneries, a lead factory, chemical works, cordage works, and shoe factories. There are six national banks with a combined capital of \$2,000,000, and two savings banks. It is connected with Beverly, Peabody, Marblehead, Lynn, and other towns by electric road, and is a centre of local trade. The town is irregularly laid out, but has a number of beautiful modern residences and three public parks. There are also several of the earliest colonial houses standing, and a large number of mansions built in the days of the town's commercial supremacy; among the former are the Corwen, or "witch house," and the birthplace of Timothy Pickering. Among the numerous points of interest in Salem are the old cemetery, formerly known as "The Burying Point," the old court-house, where the witchcraft trials were held, the new court-house, the new city-hall, the public library, the Salem Athenæum, the Essex Institute with a valuable library of nearly 400,000 volumes, and the Peabody Academy of Sciences. The Essex Institute contains a valuable historical collection of relics of colonial days and the witchcraft craze, a fine collection of old furniture and works of art, and a large number of valuable manuscripts; the Peabody Academy of Sciences contains an almost complete Essex County natural history collection, an ethnological collection from the Orient, Mexico, and South America, largely gathered by the Salem sea captains, Japan and China being largely represented; also an interesting collection of the models and pictures of ships built in Salem. The charitable institutions include a hospital, an Old Ladies' Home, an Old Men's Home, and a city Orphan Asylum. The city has a public classical and high school established 1856, and three Roman Catholic parochial

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schools; it is also the seat of two private secondary schools, a commercial school, and a State normal school. The city government is vested in a mayor, a board of aldermen of seven members, and a city council of 24. Pop. (1910) 43,697.

Consult: Felt, 'Annals of Salem' (2 vols.); Osgood and Batchelder, 'Historical Sketch of Salem'; Powell, 'Historic Towns of New England'; Putnam, 'Old Salem'; Silsbee, 'Half Century in Salem'; and 'Visitor's Guide to Salem' (published by the Essex Institute).

Revised by GEORGE FRANCIS DOW,
Secretary, the Essex Institute.

Salem, N. J., city, county-seat of Salem County; on the Salem Creek near its junction with the Delaware, and on the West Jersey & Seashore railroad, 31 miles southwest of Philadelphia, Pa. It was first settled in 1641, and this first colony was succeeded by a Swedish fort; it passed into the hands of the Dutch, then to the English in 1664, and was in that portion of New Jersey which was bought by the Quakers in 1674. The Quakers established a new and prosperous colony and in 1682 Salem was made a port of entry; in 1778 it was plundered by the British. It is the trade centre of a fertile agricultural region; and in addition to its railroad facilities has regular steamboat communication with Philadelphia. It has also a variety of manufacturing interests, including fruit canning establishments, iron foundries, glass manufactories, flour mills, an oil-cloth factory, and a hosiery mill. It has two national banks with a combined capital of \$250,000. It contains a public library, founded in 1804, and a Friends' preparatory school. Pop. (1890) 5,516; (1900) 5,196; (1910) 6,614.

Salem, Ohio, city in Columbiana County; on the Pennsylvania Company railroad; 61 miles southeast of Cleveland. It is the largest town in the county, and the centre of a rich agricultural and stock-raising region. Its manufacturing interests are numerous and varied; they include machine shops, manufactories of engines, wire nails, pumps, and stoves, galvanized iron works, furniture, church furniture, church organ factories, brick-works, and tile-works. There are two national banks with a combined capital of \$300,000. The city has a public high school, established in 1865. Pop. (1890) 5,780; (1900) 7,582; (1910) 8,943.

Salem, Ore., city, capital of the State, and county-seat of Marion County; on the Willamette river, and on the Southern Pacific railroad; 44 miles south of Portland. It was first settled in 1840 by Methodist missionaries, was incorporated as a city in 1853, and became the State capital in 1860. It has regular steamer connection with Portland, and is the trade centre of a fertile agricultural region. Its manufacturing interests are numerous and important; they include flour mills, woolen mills, fruit evaporating and canning establishments, tanneries, brick-kilns, tobacco factories, carriage and wagon factories, and agricultural implement works. The city is well built with wide regular streets and two public parks. The State Capitol, built in 1875-6, is a handsome structure; among the State institutions in the city are the Institute for Deaf Mutes, the Institute for the

Blind, the insane asylum, the reform school, and the penitentiary. The city contains the State and a Masonic library, and a public high school established in 1892; and is the seat of the Academy of the Sacred Heart (Roman Catholic), of the Capital Business College, and of Willamette University (Methodist Episcopal). At Chemawa, a few miles distant, is an Indian industrial training school. Pop. (1910) 14,094.

Salem, Va., town, county-seat of Roanoke County, on the Roanoke River and on the Norfolk & Western railroad; 51 miles west of Lynchburg. It is the centre of an agricultural and tobacco-growing region, and has a variety of manufacturing interests, including tobacco factories, tanneries, chair and carriage factories. It has a national and a State bank. The charitable institutions include two orphan asylums. There are medicinal springs in the vicinity, and it is a popular resort with Southerners. The town has a public high school and is the seat of Roanoke College, established 1853 under the control of the Lutheran Church. Pop. (1890) 3,279; (1900) 3,412; (1910) 3,849.

Salem Witchcraft. See WITCHCRAFT.

Salema, a Pacific coast food-fish (*Kyphosus analogus*), about 18 inches long and steel-blue in color. It is one of the rudder-fishes, allied to the croakers, and several closely related species are known as chopas, especially *K. sectatrix*, a large West Indian and Florida form, which is called "chub" at Key West, and affords good sport for the angler.

Sal'ep, a demulcent and slightly nutritive drug, consisting of the oval tubers of certain orchids (*Orchis mascula* and *O. morio*), but not of the hand-shaped tubers of *O. latifolia* and other species. These tubers are prepared in central and southern Europe and in the Levant, and are dug up as soon as the flower-stalks decay, being then in best condition; the skin is rubbed off, and they are dried, appearing as brownish-yellow, translucent, and horny bodies, inodorous and insipid in taste. The powdered salep, containing a large amount of mucilage and starch, makes a nutritious jelly with water, and is a suitable food for convalescents. The *Tacca pinnatifida*, growing in the islands of the Pacific, furnishes a starch called Otaheite or Tahiti salep.

Salera'tus, aerated salt; originally potassium bicarbonate, an imperfectly carbonated salt, formerly much used in cooking. The name is now commonly applied to the commercial article sodium bicarbonate, which is used in cookery to neutralize acidity and for raising dough through the evolution of carbonic acid, and is also a common constituent of baking-powders.

Salerno, sa-lér'nō (Ital. sā-lér'nō), Italy, (1) capital and seaport of the province of the same name, on the Gulf of Salerno, 32 miles southeast of Naples. It stands upon an acclivity whose summit is crowned by the ruins of an ancient citadel, and is surrounded by a massive stone wall. The Marina is a broad promenade winding for 1½ miles along the shore. The lava-paved streets are bordered with few good buildings, the chief of which is the cathedral (1084), of Gothic architecture, adorned with a portico of porphyry and Corinthian pillars from Paestum—the ruins of

which are in the vicinity. Here are the tombs of Margaret of Anjou, of Gregory VII., and a sepulchre containing the bones of St. Matthew. Other edifices are the governor's palace, theatre, hospitals, churches, and convents. It also has courts of justice, a seminary and a lyceum. The chief industries are cotton and silk spinning and printing. The manufactures are glass, ceramics, macaroni, iron, and leather goods, thread, linen, etc. There is excellent wine in the neighborhood. Founded by the Greeks, Salerno became an important city under the Romans, passing into possession of the Goths and later to the Lombards, who in turn were expelled by the Normans. Of the ancient city, Salernum, are still to be seen several temples, an amphitheatre, and a theatre. In the mediæval period it was celebrated for its school of medicine, founded by Robert Guiscard (11th century). It was annexed to the kingdom of Naples at a later period. Pop. about 45,000. (2) The province has an area of 1,916 square miles. It occupies the extremity of Campania on the Tyrrhenian Sea. It is covered with spurs of the Apennines, the chief of which are Monte Cervati, Polveraccio, Alburno, and Sacro. The principal streams are the Tusciano, Mingardo, and Alerto; the products are wheat, corn, flax, hemp, olives, figs, wine, and fruit. Pop. about 590,000. (3) The Gulf of Salerno, or Gulf of Pæstum, is a semicircular indentation of the Mediterranean Sea, separated from the Bay of Naples by Point Campanellas. On its shores stand the picturesque and interesting towns of Amalfi and Salerno, and the ruins of ancient Pæstum (q.v.).

Sales, sāl'z or sāl, Saint Francis de. See FRANCIS DE SALES, SAINT.

Salesian Fathers. See ORDERS, RELIGIOUS.

Salford, sāl'fōrd, England, a corporate town of Lancashire, adjoining Manchester, of which industrially and economically it is practically an integral portion. Pop. about 225,000. See MANCHESTER.

Sal'ic Law, an ancient code or system of jurisprudence of the Salians. It appears to have been committed to writing about the 5th century, but according to Hallam it did not originate before the time of Clovis. The particular law, commonly called the Salic law, by which females were excluded from the throne of France, has been the subject of much dispute, and its modern application was probably fortuitous. The laws of the Salians do not appear to have usually excluded women from inheritance, and the particular law on which the exclusion rests did not originally refer to the crown, but to certain lands called Salic; and does not appear to have excluded women from the line of inheritance, but only from inheriting immediately. Its object may have been to secure the performance of military service. It remained in force from this time till the close of the French monarchy.

Sal'icin, $C_{12}H_{18}O_7$, a glucoside existing in the bark and leaves of most varieties of the willow and poplar. Colorless, silky, crystalline needles, bitter taste, soluble in water or alcohol. Boiling with dilute acid gives glucose and saligenin or salicyl alcohol. Oxidation gives salicylic acid. Used to some extent as an anti-

periodic in malarial disorders, but not as efficient as quinine. Believed by some to be valuable as a substitute for salicylic acid in the treatment of rheumatism. Dose 10 to 30 grains.

Salicor'nia, a genus of the *Chenopodiaceæ*, with about 10 species, growing in saline soils. The three American species are curious naked, jointed plants, sometimes two feet high, with many opposite terete branches and leaves reduced to mere scales at the nodes, and appearing to ensheath the upper joints. The flowers are also reduced to pistils and stamens, and are pocketed in groups in hollows at the axils of, and behind, the upper scales. They are succulent herbs, so brittle as to be called glass-worts, and grow over such large areas of marsh lands that when their usual green hue turns to red in the autumn they form great patches of vivid color. Hence the common name marsh samphire.

Salicylic (sal-i-sī'lik) Acid and some of its important compounds. Salicylic acid, ortho-oxy-benzoic acid. $C_6H_4(OH).COOH$, occurs in the free condition in the buds of the *Spiræa ulmaria* (meadow-sweet) and as a methyl ester in the oil of *Gaultheria procumbens* (wintergreen). It may be prepared by oxidation of saligenin, a compound obtained from salicin; also by action of carbon dioxide on dry sodium phenolate at the proper temperature. A very pure form is obtained by the action of alkalis on oil of wintergreen. Fine white needle-like crystals of a sweetish acid taste, slightly soluble in cold water, easily so in hot. Its aqueous solution is colored a violet upon the addition of a small amount of ferric chloride. It is a valuable antiseptic, the presence of even very small amounts being sufficient to prevent the decomposition of most animal and vegetable tissues or products. Used extensively in the preservation of milk, beer, cider, meats, canned goods, and other food products. The question of its action on the consumer is still open, but the weight of evidence seems to be that its continued use is injurious to the digestive organs and to the general health. It forms a number of crystalline salts of the metals, the most important being

Sodium Salicylate, a white or pinkish white finely crystalline body, of a sweetish taste, soluble in water or alcohol. Often used as a preservative in place of the free acid, but the most important use is as a remedy for rheumatism, gout, etc. Dose from 10 to 30 grains.

Methyl Salicylate, $C_6H_4(OH).CO.OCH_3$, synthetic oil of wintergreen, forms the larger part of the oils of wintergreen and of birch, may be made by action of methyl alcohol (wood spirit), sulphuric acid, and salicylic acid. The compounds derived from salicylic acid that are used in medicine are very numerous, some of the important ones being Salicylanid, Salol, Salophen, Betol, Salifebrin, Salipyrin, etc. They are used as antiseptics or as antirheumatics.

Salicylol, **Salicylic Aldehyde**, or **Ortho-oxy-benzoic Aldehyde**, is a volatile oil occurring in the blossom of the meadow-sweet. May be obtained by careful oxidation of saligenin or salicin. An aromatic oil, colorless when pure, but turning red on exposure to light and air, slightly soluble in water, easily so in alcohol.

SALIDA — SALISBURY

Used to some extent in the perfume industry, and as a flavoring substance. Said to be added to vermouth and other liqueurs.

Salida, sa-lí'da or sa-lé'da, Colo., city in Chaffee County; on the Denver & Rio Grande railroad; 64 miles southwest of Colorado Springs. It is the centre of a mining region where iron, copper, and silver are the principal ores; marble, onyx and limestone are also quarried in the vicinity; and agricultural and stock-raising interests are of some importance. The city contains large railroad shops, and a bank with a capital of \$50,000. The Rio Grande General Hospital is located here, and there is a public high school. Pop. (1890) 2,586; (1900) 3,772; (1910) 4,425.

Salii, sā'lī-i, priests of Mars in ancient Rome, so called from the Latin word *salire*, to leap and dance. Numa fixed their number at 12; Tullus Hostilius added another 12, who were called Salii Collini. Their origin is thus accounted for by the Romans: In the time of Numa Rome was desolated by a pestilence, which ceased when the gods let fall from heaven the "ancile" (a shield of a peculiar form). The soothsayers declared that this shield was the sign of the perpetuity of the Roman power, and advised that 11 others should be made similar to it, so that the true ancile could not be so easily purloined. This advice was followed. On the 1st of March every year when the Salii offered sacrifices to Mars they carried the shields about the city, clashing them together, executing war-like dances, and singing the Salian hymns—ancient songs in praise of Mars and the other gods, and of distinguished men, particularly of Mamurius, who made the 11 shields. The dress of the Salii was a purple tunic embroidered with gold, and bound with a brazen belt, and a toga with a purple border. On their head they wore a high cap in the form of a cone, with a sword by their side, a spear or rod in their right hand, and an ancile in their left. None but patrician youths whose parents were alive could be admitted among the Salii.

Salina, sā-lé'nā, Kan., city, county-seat of Saline County; on the Smoky Hill River, and on the Union Pacific, the Missouri Pacific, the Atchison, T. & S. Fé, and the Chicago, R. I. & Pacific Railways; 110 miles west of Topeka. Salina was founded in 1857 by Col. William A. Phillips; became a borough in 1873; and a city in 1880. It is governed by a mayor and eight councilmen elected for two years. It is the commercial centre for a fertile agricultural and stock-raising region, and valuable salt springs and gypsum quarries are in the vicinity. It has several grain elevators, and exports large quantities of grain; extensive flour and paper mills, and other manufactories. There are three banks with a combined capital of \$150,000; 11 denominational churches; high school, public library, and federal court buildings. It is the seat of St. John's Military School (Protestant Episcopal), Kansas Wesleyan University, Skelton's Business College, and the Kansas Wesleyan Business College. Pop. (1910) 9,638.

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Salina Formation, or **Salina Stage**, in North American geology an important group of beds, belonging to the upper part of the Siluric

series (q.v.), named from a township in Onondaga County, New York, where salt springs, issuing from this formation, were discovered in the 17th century by the Jesuit missionaries. The formation, which consists mainly of shales, with frequently extensive salt and gypsum beds, comes to the surface in an east and west belt extending from Herkimer County, New York, westward across the Niagara River into Canada. Its erosion has caused a belt of low, often swampy country, averaging normally from 8 to 15 miles in width, which is followed by the Erie Canal and the New York Central and other railroads. The formation extends across Canada, where its outcrop is chiefly drift-covered, into Michigan, where it comes to an end. Southward it is known in northern Ohio (500 feet thick) at a depth of 2,000 feet below the surface, but disappears in southern Ohio. Southeastward the formation is known in Pennsylvania and Maryland. The salt of the formation is distributed in irregular lenticular beds, which, with their outer stratified shale seams, often aggregate several hundred feet in thickness. The salt is largely obtained from wells by the leaching process and the solar evaporation of the brine. The chief localities where this is carried on in New York State are Syracuse and Warsaw. The beds of this formation are for the most part non-fossiliferous, and were deposited in an enclosed basin or dead sea which characterized eastern North America in late Siluric time. See *PALÆOZOIC*; *SALT*.

Salinan (sā-lé'nān) **Indians**, named from Salinas River. A linguistic family of North American Indians formerly inhabiting parts of San Luis Obispo, Monterey, and San Benito counties, California, their habitat extending from the Coast Range to the Pacific and from the headwaters of the Salinas River to near the present Solidad. They subsisted by hunting and fishing, eking out their livelihood by means of acorns, seeds and roots. They manufactured coiled basketry, but of their general habits and customs almost nothing is known. The missions of San Antonio (1771) and San Miguel (1797) were established among them by the Spanish fathers, the baptisms during the mission period numbering 4,400 and 2,400 respectively. The population gradually decreased, however, and now the stock is represented by only a score of individuals.

Salinas, sā-lé'nās, a river in California, in Monterey County, which flows north by west into Monterey Bay. It is about 150 miles long.

Salisbury, sāl'z'bū-rī, Edward Eldridge, American philologist: b. Boston, Mass., 6 April 1814; d. New Haven, Conn., 5 Feb. 1901. He was graduated from Yale in 1832, and from Yale Divinity School in 1835. After some years spent abroad in the study of Oriental languages, he was made professor of Arabic and Sanskrit at Yale in 1841. He was president of the American Oriental Society in 1863, and for several years conducted its official organ. He was the author of a 'Discourse on Arabic and Sanskrit Literature' (1843); 'Principles of Domestic Taste' (1877).

Salisbury, Robert Arthur Talbot Gascoyne Cecil, MARQUIS OF, English statesman: b. Hatfield, Hertfordshire, 3 Feb. 1830; d. there 22 Aug.

1903. He was educated at Eton and at Christ Church, Oxford, became a fellow of All Souls' in 1853, was elected (as Lord Robert Cecil) to the Commons as a Conservative for Stamford in 1854, and continued to represent that borough until 1868. In Parliament he quickly made his mark as a brilliant and caustic Tory debater; and he was active in the discussion of public measures, especially as an opponent of the abolition of church rates in 1858 and a supporter of Disraeli's reform-bill in 1859. Made secretary for India in the Derby ministry in 1866, he was again placed at the head of the India office in 1874 by Disraeli. He accompanied the latter in 1878 to the Congress of Berlin, and contributed largely toward the result of its deliberations. The Gladstone campaign having carried everything before it at the general elections of 1880, he was in the opposition until 1885 and its leader in the upper house from Disraeli's death in 1881. From this time until his retirement in July 1902, he retained supremacy over his party, never questioned in the Lords and rarely in the lower chamber. Gladstone was defeated on a budget resolution, and in June 1885, Salisbury organized his first ministry, himself taking the portfolio of foreign secretary. But after a ministry of 227 days, Gladstone returned to power in February 1886. Salisbury kept up a vigorous struggle against the Home Rule bill, and following on Liberal reverses (1886), became a second time prime-minister, and, after a cabinet reconstruction, also foreign secretary. During this second administration, which continued until 1892, several measures of importance were passed into law; but Home Rule, once more placed at the head of the Liberal programme, aroused through Gladstone's influence so wide an interest that the general elections of June 1892 once more swept the Conservatives from office. When the Home Rule bill came up for its second reading before the Lords in September, Lord Salisbury asked for the throwing out of the bill, which was promptly effected with but 41 dissenting votes. Gladstone relinquished the premiership to Rosebery, who went out of office in 1895. Salisbury then held his third, last, and longest ministry from 2 July 1895 to 11 July 1902, in all 7 years and 9 days. He had to deal with the Armenian and Cretan questions; with the safeguarding of British special interests in China, the Venezuelan boundary question and the United States attitude thereto, the Egyptian campaigns, the Fashoda affair, and the South African war (1899-1902). Though he found it in later years a matter of necessary policy to maintain good terms with the Washington government, his attitude was in reality the traditional Tory one of dislike for the United States and its diplomacy. After the elections of 1900, the cabinet was reconstructed, Lord Salisbury becoming lord privy seal, and Joseph Chamberlain taking the foreign secretaryship. It was said that the premier failed to direct the war policy, and that Chamberlain was the leading figure of the cabinet. Salisbury withdrew from public office in 1902, to be succeeded as premier by A. J. Balfour. He observed throughout his career a consistent procedure as a Tory, and carried his high office with distinction, though his statesmanship has been called in question. In both domestic and foreign matters he had much of contempt for the governed classes. His knowledge of

diplomatic minutiae was extensive, and he was looked upon as the dean of European chancelleries. Outside of his public life he held numerous offices of honor, including that of Lord-Chancellor of Oxford from 1869; and he was much interested in the physical sciences. (See ENGLAND, *History*.) Consult: Puling, 'Marquis of Salisbury' (1885); Traill, 'Marquis of Salisbury' (1891); Aitkin, 'The Marquis of Salisbury' (1901); How, 'The Marquis of Salisbury' (1902).

Salisbury, Rollin D., American geologist: b. Spring Prairie, Wis., 17 Aug. 1859. He was graduated from Beloit College, Wisconsin, and taught in the academy of that institution in 1881-3. He accepted the chair of geology there in 1884, occupying it until 1891 with the exception of 1887-8, which he spent at the University of Heidelberg. He was appointed professor of geology at the University of Wisconsin in 1891, and since 1892 has occupied the chair of geology at the University of Chicago. He has been connected with the United States geological survey since 1883, with the New Jersey State geological survey since 1891, and has published: 'Physical Geography of New Jersey' (1896); 'Geography of Chicago and its Environs' with W. A. Allen (1899); 'Geography of the Region about Devil's Lake and the Dalles of Wisconsin' with W. W. Atwood (1900); etc.

Salisbury, formerly **Fort Salisbury**, Africa, capital of Southern Rhodesia, in Mashonaland, 372 miles by rail from Beira on the eastern coast, and 298 miles by rail north of Bulawayo. Its two parts are known as the Causeway and Kopje, separated by an intervening space of about three quarters of a mile. Municipal and government offices have been established; and there are several hospitals, a cathedral, stock exchange and other buildings. Causeway is the residential district and government headquarters; the Kopje, the business district. Gold and coal mines abound in the environs, and the plateau is suitable for agriculture. The increasing native and European population includes over 500 whites.

Salisbury, Conn., town, Litchfield County, on the Housatonic River, and on the Philadelphia, Reading & New England railroad; 63 miles northwest of Hartford. The town contains the villages of Salisbury, Lakeville, Lime Rock, Chapinville, and Ore Hill. It was first settled about 1720 by Dutch from New York; New England settlers came to the town about 1740 and it was incorporated in 1741. The mining of the iron ore found in the vicinity soon became an important industry, and during the Revolutionary War much of the cannon, shot, etc., for the colonies was made at Salisbury. The iron mines continue to yield ore of excellent quality, and the town has several blast furnaces, also a cutlery factory, a railroad machine shop, and a foundry. The region is hilly, and the township contains Bear Mountain, the highest elevation in the State. The Connecticut School for Imbeciles is located here; there is a public academy (high school), a public library, established by the Library Association in 1771; also Saint Austin's School, a Protestant Episcopal secondary school. Pop. (1890) 3,420; (1900) 3,489; (1910) 3,522.

SALISBURY — SALISHAN INDIANS

Salisbury, or **New Sarum**, *nū sā'rūm*, England, a cathedral city, the capital of Wiltshire, 80 miles southwest of London, stands on the Avon at its confluence with several smaller branches. It is built in modern style, and the streams by which it is divided are crossed by bridges which connect the various sections of the town. Most conspicuous among the public buildings is the splendid cathedral, dating from 1220, one of the grandest and most interesting specimens of Gothic architecture in England. It is in the form of a double cross, with a graceful and exquisite interior and has a spire 404 feet high. The light and airy pillars and pilasters are of Purbeck shell marble. There is some stained glass, and many interesting old monuments. Within the spacious precincts of the cathedral are the episcopal palace, the deanery, and other buildings. There are three parish churches in the town, besides a Roman Catholic chapel, an artistic structure. The market-place is a central wide open space, at the southeast corner of which stands the council-house, with a handsome Doric portico. Saint Nicholas Hospital and the Poultry Cross are ancient edifices of some architectural merit. Educational and charitable institutions are numerous. Salisbury was formerly renowned for its manufactures of woollens and cutlery, but is at present chiefly important as a distributing centre.

Salisbury, Md., village, county-seat of Wicomico County; on the Wicomico River, and on the Baltimore, C. & A. and the New York, P. & N. R.R.'s; 84 miles southeast of Baltimore. It is in an agricultural and lumbering region, and has a large trade, exporting chiefly grain, fruit, vegetables, and lumber. The most important manufacturing establishment is a yellow pine box factory, the largest in the United States; there are also saw and planing mills, flour mills, and a wool carding mill. There is a national bank with a capital of \$50,000, and a state bank. The village has a public high school established in 1872. Pop. (1910) 6,690.

Salisbury, N. C., city, county-seat of Rowan County; on the Southern railroad; 130 miles west of Raleigh. It was originally settled by English churchmen from Salisbury, England, and was named for that city; it was selected as the county-seat as early as 1753, but was not chartered until 1770. It is the centre of an agricultural and mining region; and contains tobacco-factories, iron foundries, machine shops, railroad workshops, tanneries, and cotton and woolen mills. There is a national bank and a state bank. The city has a public high school, established in 1899, which had in 1903 a library of over 1,200 volumes; and it is also the seat of Livingstone College, established in 1882, by the African Methodist Episcopal Church, for the education of the colored race, and the State Colored Normal School. Pop. (1910) 7,153.

Salisbury Plain, England, in the county of Wilts, is a high, rolling plain of considerable extent and of chalky formation, from which diverge the majority of the hill chains of central and southern England. The name applies actually to the district lying between Salisbury

and Devizes, although the plain may be said to extend both north and south of Salisbury. It is about 20 miles long, by 14 broad, the greater length being from north to south. Eight miles north of Salisbury, upon this plain, stands the historical and desolate Stonehenge (q.v.).

Salishan (*sā'līsh-an*) **Indians** (*Okanagan, sālšt*, "people"), referring specifically to the Flathead Indians, hence *Salish*, or *Selish*, of which the stock name is an adaptation. A linguistic stock of North American Indians comprising a large number of tribes or bands, most of them insignificant in numbers, the original habitat of which included an isolated area on the Oregon coast, occupied by the Tillamook and Nestucca, who were separated from their congeners to the north by Chinookan and Athapaskan tribes; then beginning on the northern coast of Shoalwater Bay Salishan tribes occupied the entire northwestern part of Washington, including the Puget Sound region, excepting small tracts about Cape Flattery and southward, and near Port Townsend, which were held by Chimakuan tribes. Eastern Vancouver Island was also inhabited by Salishan tribes, while the greater part of their territory lay on the mainland opposite, including much of the upper Columbia. On the south they were hemmed in mainly by Shahaptian tribes; on the east they dwelt to a little beyond the Arrow lakes and their feeder, one of the extreme northern forks of the Columbia, where they were met by Lewis and Clark in 1804. On the northeast Salishan territory extended to about lat. 53°. In the northwest the main area did not reach Chilcat River, but the Bella-coola occupied an isolated area on Dean inlet, Burke channel, and Bellacoola River, British Columbia. The Salishan tribes were successively visited by Juan de Fuca (1592), by the Spanish navigators who later explored the coast, by George Vancouver (1792-4), and by Lewis and Clark (1804-6), who gave the first definite information regarding them. The fur-traders penetrated their country early in the 19th century and while Astoria, at the mouth of the Columbia, was not founded within their immediate territory, its establishment formed the beginning of the change in the primitive condition of the Salishan and the surrounding tribes which perhaps reached its climax soon after the establishment of the trading post at Victoria, B. C., in 1843. In their habits and customs the Salishan Indians may be divided into the coast and the interior groups. Among the former, at least, the gentile system is recognized, descent being in the male line; their houses are long communal structures, built of puncheons and designed to accommodate several families, each with its own fire; sea products formed their chief sustenance; the canoe played an important part in their daily life; slavery was practised, and the *pollatch*, a curious institution which consisted of elaborate feasting and the distribution of personal property, held sway to such an extent as frequently to impoverish the most progressive members of the tribe. The interior Salishan tribes hunted and fished for salmon in the many streams that drain their former territory; their

SALIVA — SALIVARY GLANDS

houses, unlike those of the coast, were conical, constructed of poles covered with grass, pine-needles, bark, and earth. The custom of head-flattening was practised particularly among the coast Salish, but, strange as it may seem, this habit did not prevail among those members of the stock now designated by the name "Flat-heads." There are many tribes or sub-tribes of the Salishan stock in Washington, Montana, and British Columbia, numbering in all about 18,500 individuals, of whom about 8,000 are within the limits of the United States. The principal Salishan tribes within Canadian territory are the Lillovet, Okanagan, Thompson Indians, and Lhuswap. Of the population of the Canadian divisions of the stock little reliable information is obtainable, as many tribes or tribal divisions are assembled on each of several reservations, only the combined population of which is known. These are distributed as follows: Fraser River agency, about 5,000; Kamloop's agency, about 2,600; Cowichan agency, about 1,850; Okanagan agency, 950; Williams Lake agency, 1,900; Kootenay agency, 50. The principal Salishan tribes or bands on reservations in the United States are:

Colville Agency, Washington.—Cœur d'Alène (Skitswish), 474; Colville, 296; Kalispel or Pend d'Oreilles, 150; Lake or Senijextee, 307; Spokane, 653; Okanagan, 575; Sanpoil and Nespelem, 400.

Puyallup Agency, Washington.—Chehalis, 156; Georgetown, Humptulip, Quaitso, and Quinaiel, 324; Nisqually, 107; Puyallup, 536; Skallam or Clallam, 317; Skokomish, 165; Squaxon, 118.

Tulalip Agency, Washington.—Lummi, 340; Muckleshoot (collective), 148; Port Madison, 150; Swinomish, 313; Tulalip, 488.

At Large in Washington.—Nooksak, 200; Piskwans or Wenatchi, 166.

Flathead Agency, Montana.—Charlot's band of Flatheads, 157; Confederate Flatheads, Pend d'Oreilles, and Kootenai, 1,310; Lower Kalispel or Pend d'Oreilles, 53; Spokane, 77.

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Saliva. See SALIVARY GLANDS.

Salivation, or **Ptyalism**, a superabundant secretion of saliva, sometimes occurring in disease, but usually, in medicine, either determined locally by the use of masticating irritants, or by drugs which act upon the whole system, especially by mercurial preparations. In the last case it is accompanied by a coppery taste, and by the swelling of the gums, which become of a pale rose color, except close to the teeth, where they are of a deeper red. The breath is "mercurial" and very fetid, and the teeth seem elongated and loosened. If the use of mercury is continued the swelling of the gums increases; it affects the tongue and all the salivary organs; finally, the mucous membrane is studded with small superficial ulcers covered with a white skin. Salivation is ordinarily anticipated, during mercurial treatment, by maintaining cutaneous perspiration by means of warm baths, friction, and exercise. If salivation is persistent notwithstanding the use of these means, emollient gargles containing more or less of opium are used, and on the abatement

of the salivation they are replaced by astringent tonics. Salivation was formerly frequent, but has become rare through modifications in mercurial treatment.

Salivary Glands, the glands which secrete saliva, the fluid of the mouth, or spittle; that secretion whereby food in the mouth is reduced to a pulpy condition, and through the chemical action of which certain changes are effected in the constituents of the food. In man the salivary glands comprise three pairs, as in the mammalian class generally. Of these the largest is the parotid gland, lying in front of the ear, before the mastoid process of the temporal bone, and behind the ramus of the lower jaw. Its duct is the parotid duct, or duct of Steno. It opens into the mouth opposite the second upper premolar tooth. This gland measures from $2\frac{1}{2}$ to 3 inches in length, and is nourished by branches from the main trunk of the external carotid artery, from the temporal, facial, and other blood-vessels. The submaxillary gland, next in size, is in the lower portion of the lower jaw, above the digastric muscle. Its duct (Wharton's duct) is about 2 inches long, and its arteries and veins are derived from the facial and lingual vessels. The third distinct salivary gland, the sublingual, is still smaller, and is situated on the floor of the mouth, beneath the front part of the tongue. It is from $1\frac{1}{2}$ to 2 inches through its long axis. Its numerous ducts open on the floor of the mouth by many minute apertures. The excretory ducts of subsidiary glands in the mouth open simply on the mucous membrane of the mouth. The minute or microscopic structures of the salivary glands are composed of lobes in turn composed of lobules, each of which contains a small branch of the main duct of the gland, the subdivisions of which ultimately terminate in minute vesicles or sacs, known as acini. The salivary fluid as found in the mouth is usually mixed with the mucus secreted by the mucous or lining membrane of the mouth, and is thus rendered of viscid consistence.

Salivary glands are absent in some mammals, as whales; in some reptiles, as crocodiles; and in most fishes. In mammals alone salivary glands are present of the definite structure seen in man; but in many reptiles, as in serpents, definite (buccal) glands exist, within the inside margin of the jaws. In birds the submaxillary glands may be of large size; and in some forms, as woodpeckers, the saliva may be normally of a viscid consistence, adapted for smearing the tongue, and for thus aiding in the capture of insect-prey. Swifts, as is well known, secrete in their salivary glands a glutinous substance of which in great part, often almost wholly they build their nests. (See BIRDS' NESTS, EDIBLE.)

When first secreted, saliva gives an alkaline reaction. During digestion this alkaline condition persists. During fasting saliva gives a neutral reaction, as also when slowly secreted, its alkalinity then being neutralized by the acid of the mucus of the mouth. Microscopically examined, saliva shows minute solid particles, probably derived from the secreting structures; and when mixed with the fluids of the mouth it contains also epithelial scales from the mouth

and tongue, and mucus corpuscles, mostly from the tonsils. Freed from these, the saliva is a fluid either colorless or bluish-gray.

During mastication the flow of saliva is greatly accelerated, the presence of food in the mouth acting as the stimulus to its secretion; and different foods affect the secretion in different degrees; while mental impressions, without the presence of food, will cause saliva to flow, or will "make the mouth water." The functions or uses of saliva are both mechanical and chemical. It acts mechanically to incorporate and mix the food in the mouth, to render swallowing easier, and to keep the tongue and mouth moist, so aiding articulation. (See DIGESTION.)

The secretion of the pancreas markedly resembles that of the salivary glands in chemical composition, and exerts an action on the food similar in many respects, and in those forms in which salivary glands may be wanting or undeveloped the pancreatic secretion may supply the place of the salivary fluid. Among invertebrates salivary glands are usually well represented. Insects and other *Annulosa*, and the generality of mollusks thus possess definite structures devoted to the secretion of the salivary fluid.

Calculus concretions (salivary calculi) may form in the salivary glands, and may cause obstruction of their ducts, and necessitate the performance of an operation for their removal. Saliva would appear to become abnormal and to constitute a source of infection in hydrophobia or rabies; and syphilis is said to have been transmitted through this medium. Occasionally the elements of urine have been present in saliva—forming the so-called urinary saliva of pathologists—in consequence of diseased conditions, on the removal of which the secretion became restored to its normal composition. Milky saliva, so named from the presence of milk constituents, has also been described as a condition occurring in some parturient women.

Salix, one of the two genera of the family *Salicinea* (the other being *Populus*). The species are dioecious trees and shrubs, inhabiting principally the northern hemisphere and the temperate and arctic zones, and very abundant therein, especially along the banks of streams and ponds. The leaves are alternate and narrow, and the small flowers, reduced to a disk bearing either stamens or pistil, according to sex, are gathered into unisexual catkins, each flower subtended by a bract. These catkins usually appear before the leaves, and are fertilized by insects, having nectaries for their attraction, the male flowers, moreover, showing large bright-colored anthers, and a honey-like odor. The two-valved capsules contain numerous seeds, crowned by dense plumes of soft hairs, which enable them to float off on the wind, and be disseminated by it.

Many fossil forms of *Salix* have been found. Salicin is a crystalline glucoside obtained from the bark of various species of *Salix*, and is one of the sources of salicylic acid, for which it is sometimes substituted in medical practice. See also WILLOW.

Sallee, *sā-lē'*, **Sali**, or **Sia**, Morocco, a seaport on the western coast of the Atlantic, 106

miles west of Fez, at the mouth of the Buregreb, formerly the great centre of Moorish piracy, immense depredations being committed from it upon European commerce. The river, which formerly admitted large vessels, is now choked up with sand. On the opposite side of the river stands Rabat (q.v.), called often New Sallee. Pop. of Sallee about 12,000.

Sallust, *sāl'üst* (GAIUS SALLUSTIUS CRISPUS), Roman historian: b. Amiternum, in the Sabine district, 1 Oct. 86 B.C. (668 A.U.C.); d. Rome 13 May 35 B.C. (719 A.U.C.) or 34 B.C. (720 A.U.C.). He held the offices of quaestor and *tribunus plebis*, attained senatorial rank, was of the Cæsarian faction in the civil war, went to the war in Africa as prætor in 47 B.C., and after the close of the struggle at Thapsus was made commander in Africa with title of proconsul. Having returned to Rome in 45 B.C., he formed the extensive gardens celebrated as the *horti Sallustiani*. The chief remains of his historical works are two monographs, one on the conspiracy of Catiline ('*De Conjuratione Catilinæ*'), the other on the war against Jugurtha ('*De Bello Jugurthino*'). The 'Catiline' was prepared more largely from literary sources than from the original documents which appear to have been accessible; hence it is vague and inaccurate as to chronology and fact. It aims rather at the explanation of motive and general development, and this it expresses with frequently epigrammatic neatness, but at times so sentimentally as to be obscure and involved. The 'Jugurtha' exhibits much the same features, but is based on a more thorough research, and is more finished and even in style. Of Sallust's largest work, the five books of 'Historiæ,' there are extant only four speeches, two letters, and a few fragments. There are editions of the 'Catiline' by Schmalz (1886), Thomas (1884), Cook (1884), and Turner (1887); of the 'Jugurtha' by Thomas (1877), Schmalz (1886), and Brooke (1885); of both, with fragments of the 'Historiæ,' by Frazer (1890), Merivale (1858), and Capes (1884). There is an English version by Pollard (1882).

Sally-Lunn, the name given a popular tea-cake; so called from Sally Lunn, a pastry cook of Bath, England, who used to cry them about in a basket at the close of the 18th century.

Salm-Salm, *zālm-zālm*, **Felix**, German soldier: b. Anhalt, Prussia, 25 Dec. 1828; d. Gravelotte, Alsace, 18 Aug. 1870. He was the youngest son of the reigning prince Salm-Salm, and became an officer in the Prussian army, but later joined the Austrian army. In 1861 he came to the United States, and served during the Civil War as colonel of the 68th New York regiment. He next offered his services to Maximilian, of Mexico, whose fortunes he followed as aide-de-camp and chief of the imperial household, until the death of that emperor, when he again entered the service of Prussia. He was killed in the battle of Gravelotte during the Franco-Prussian war. His wife, AGNES LECLERCQ, an American actress, whom he married in 1862, accompanied him upon all his subsequent campaigns, and became known for her deeds of bravery and ministrations to the sick and wounded. Her experiences in Mexico and

other fortunes of war are told by her husband in his book: 'My Diary in Mexico in 1867.'

Salmagundi, a dish of minced meat, seasoned with pickled cabbage, eggs, anchovies, olive oil, vinegar, pepper, and similar ingredients. In an applied sense the word means pot-pourri, a medley, a miscellany.

Salmagundi Club, a famous club of artists in New York, established in 1875. In 1904 it had upward of 400 members. The club house in West 12th Street, New York, was formerly the residence of Rogers, the sculptor.

Salmasius, sāl-mā'shī-ūs, **Claudius** (Latinized name of CLAUDE DE SAUMAISE), French scholar: b. Sémur-en-Auxois 15 April 1588; d. 3 Sept. 1653. His father, a learned man, instructed him in the ancient languages, and then sent him to Paris to study philosophy. His edition of 'Florus,' published in 1609, is a remarkable proof of his early erudition. In 1606 he went to Heidelberg to study law under the celebrated Gothofredus (Godefroi). On his return to France in 1610 he began to practise law, but soon withdrew to devote his whole time to critical labors and learned controversies. His mother, a Calvinist, had educated him in Protestant principles; and in 1623 he married a Protestant. Several years later he passed some time at the country seat of his father-in-law, near Paris, where he completed his great labor on Pliny and Solinus. In 1629 his father was desirous of transferring to him his own place as magistrate, but as he openly professed Calvinism, the keeper of the seals, Marillac, refused to sanction the nomination. In 1651 he accepted the professorship which had been held by Scaliger at the University of Leyden. His friends made several attempts to recall him to France, and Cardinal Richelieu offered him a pension on condition of his writing a history of his ministry; but Salmasius declined all these offers. In 1649 Charles II. of England induced him to write a defense of his father ('Defensio regia pro Carolo I.'), which was answered by Milton's 'Defensio pro Populo Anglicano.' (See MILTON.) The 'Defensio Regia' offended his republican patrons in Holland, and he accepted the invitation of Queen Christina to visit Sweden (1650). But the climate was so unfavorable to his health that he returned to Holland the following year. The most important of his works are: 'Plinianæ Exercitationes in Solinum'; 'Scriptores Historiæ Augustæ'; 'De Mutuo'; 'De Modo Usuratum'; 'De Fœnore Trapezitico'; 'De Re Militari Romanorum'; 'De Re Hellenistica'; 'Observationes in Jus Atticum et Romanum.' Besides the classical and many modern languages, he was acquainted with Hebrew, Chaldaic, Arabic, Persian, and Coptic.

Salmon, sām'on, **George**, Irish mathematician: b. Dublin, Ireland, 25 Sept. 1819. He was educated at Trinity College, Dublin, took orders in the Anglican Church and was professor of divinity at Dublin University in 1866-88. He was president of the mathematics and physics section of the British Association in 1878, and since 1888 has been provost of Trinity College, Dublin. He has published: 'Conic Sections'; 'Geometry of Three Dimensions'; 'The Reign of Law' (1873); 'Infallibility of the Church'

(1888); 'Cathedral and University Sermons' (1900); etc.

Salmon, a fish of the family *Salmonidæ*, regarded as the highest type of the true or teleostean fishes. The eminent American ichthyologist, Dr. D. S. Jordan, who has made a special study of this group, speaks of it as follows: "As now restricted, this is no longer one of the large families of fishes, but in beauty, activity, gaminess, and quality as food, and even in size of individuals, different members of the group stand easily with the first among fishes. The *Salmonidæ* are confined to the northern regions, and north of about 40° N., are everywhere abundant where suitable waters occur. Some of the species, especially the larger ones, are marine and anadromous, living and growing in the sea, and entering fresh waters to spawn. Still others live in running brooks, entering lakes or the sea as occasion serves, but not habitually doing so. Others again are lake fishes, approaching the shore, or entering brooks in the spawning season, at other times retiring to waters of considerable depth. Some of them are active, voracious and gamy, while others are comparatively defenseless and will not take the hook. The large size of the eggs and their lack of adhesiveness, with the ease by which the eggs may be impregnated, render the salmon and trout especially adapted for artificial culture. The *Salmonidæ* are of comparatively recent evolution, none of them occurring as fossils, unless it be in recent deposits. The instability of the specific forms and the lack of sharply defined specific characters may be in part attributed to their recent origin, as Dr. Gunther has suggested."

The family includes the American genera *Coregonus* (whitefish), *Argyrosomus* (ciscoes), *Stenodus* (inconnus), *Cristivomer* (lake-trout), *Salvelinus* (charrs or "trout"), *Oncorhynchus* (Pacific salmon), and *Salmo* (Atlantic salmon, and salmon-trout).

ATLANTIC SALMON.—The body of the Atlantic salmon (*Salmo salar*), native to the rivers of both sides of the North Atlantic, is moderately elongate and but little compressed; the greatest depth is about one fourth the total length without the caudal fin. The length of the head is about equal to the depth of the body. The mouth is of moderate size. The scales are comparatively large, and number about 120 in the lateral line. The dorsal fin has 11 rays and the anal 9 rays. The color, like the form, varies with sex, age, food and condition. The adult is brownish above and silvery on the sides, with numerous small black spots often X or XX shaped, on the head, body and fins, and with red patches along the sides of the male. Young salmon (parrs) have about 11 dusky cross-bars, besides black and red spots. Weight 15 to 40 pounds.

Its original natural range in America stretched from Greenland to Long Island Sound.

The vast abundance of salmon was one of New England's chief recommendations to immigration in colonial days. The Merrimac is reported to have been so filled with them during the spring migration that they sometimes crowded those near the banks out on dry land. Even as late as 1783 Peters reported in his 'History of Connecticut' that the "shad, bass and salmon more than half support the province."

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There is no good reason to suppose that they did not originally run in the Hudson, although direct evidence that they did so in abundance is lacking. DeKay mentions that one was taken in August, 1840, near Troy, N. Y., weighing 40 pounds. Long before that year, however, the New York market had ceased to be supplied from the Connecticut, and had begun to bring salmon from the Kennebec, packed in ice. In the Saint Lawrence, however, few if any salmon entering the river from the sea ever ascended as far as Lake Ontario, and the salmon inhabiting that lake and its tributaries have always, as a rule, made the lake their sea, and the limit of their downward migrations. The reason for the decline was everywhere the same—over-fishing in the rivers with seines, and the damming of the upper streams for milling or other purposes. Although Peters had recorded that in 1783 salmon “fill the Connecticut River for many days, and no finite being can number them,” the Rev. D. D. Field stated in 1819 that they had scarcely been seen there for “15 or 20 years.”

In respect to the habits and feeding of the salmon Dr. G. Brown Goode has written at great length. He remarks that most of the tribe are peculiarly fresh-water fishes, though several share the sea-dwelling habit, and others, like the brook-trout, descend into salt water when not prevented by barriers of temperature. “I am inclined to the view that the natural habitat of the salmon is in the fresh waters, the more so since there are so many instances . . . where it has been confined for years in lakes without apparent detriment. . . . The salmon while it remains in the sea, or in the brackish estuaries, takes particular delight in feeding on crustaceans and their eggs, small shrimps and young crabs. When in the rivers they eat but little, though they are at times eager enough for food, as testify their voracious rushes at the angler's fly-hook. The absenteeism of the salmon is due principally to the dearth of desirable food in the rivers. The young fish stay in fresh water for one and frequently two years. When they pass down to the sea they weigh but a few ounces. They find congenial food and begin to grow rapidly. The broad world of ocean affords them new opportunities for adventure and self-advancement, and it is only when summoned by the duties of family life that they return within the narrow limits of the old home. When salmon live in the lakes they prey upon minnows and other small fishes, but those of the sea delight also in small crustaceans and their eggs, to which they owe the vivid color of their flesh. The habits of successive generations become hereditary traits.”

It is as an adult, four years or a little more old, that the salmon enter the rivers and work their way toward their head. They have been for two or two and a half years in the sea, where and how living is little known; but the probability is that they do not go very far from the mouth of the river in which they were born. They enter as soon in the spring as the water has reached a moderate degree of warmth, and therefore appear in southern rivers much earlier than in northern ones. They are in magnificent condition, and make their way up-stream with extraordinary persistence and force, overcom-

ing swift rapids, climbing cataracts and leaping unbroken falls as much as 12 feet high; but only the strongest can accomplish so great a feat, and sometimes only after repeated efforts. It is during this early advance that the angler seeks the streams where they are running and throws his line for the grandest sport afforded by fly-fishing in fresh waters. Having reached, as near as time or circumstances permit, to the sources of the stream the eggs are poured out in vast quantities by the females, and simultaneously the males void their milt, so that impregnation takes place at once. This takes place in our rivers late in October or in November. The development of the embryo proceeds for a time, but soon is checked by the winter cold, so that it does not burst the shell of the egg until the next April or May.

At this time the embryo salmon has a slender half-transparent trunk, less than an inch in length, carrying, suspended beneath, an immense ovoid sac—the “yolk-sac.” For about six weeks after hatching it hides in crevices among stones, keeping up an incessant fanning with its pectoral fins. During this period it takes no food, but is supported and nourished by the yolk-sac, the substance of which is gradually absorbed into the rest of the body, and not until the sac has nearly disappeared does the salmon really look like a fish and begin to seize and swallow food. It now puts on a mottled coat, with several heavy dark bars across its sides, and bright red spots, larger and fewer than those of a trout, and looks therefore very unlike the adult salmon but much like a young trout. In this stage it is termed, in Scotland and England, a “parr,” and it was formerly thought to be a wholly different species from salmon.

The parr stage lasts a year or two in British rivers, and the few observations made in America indicate that it is more likely two years than one in our rivers. The parr, at first but little over an inch in length, is provided with good teeth and a good appetite, and beginning to feed at a season of the year when the water is almost crowded with small insects and other more minute creatures, it grows rapidly, probably increasing its weight 30 or 40 times the first summer. In two years it reaches the length of 6 or 8 inches, and its bright red spots and dark bars have given place to a silvery coat like the adult salmon. It is now termed a “smolt” and is ready to go to sea, which it does with little delay, and passes out beyond the range of man's observation, but to a region where it finds a rich feeding-ground and rapidly increases in size. In northern rivers, those of New Brunswick and beyond, as in those of northern Europe, the salmon returns from the sea when it has attained a weight of 2 to 6 pounds, and is then termed a “grilse.” In the rivers of Canada, in general, grilse occur in great numbers, coming in from the sea at a later date than the adults, but ascending like them to the upper waters, mingling freely with them, rising to the same fly, and caught in the same weirs. In our rivers grilse are seldom seen; yet it by no means follows from this that our salmon do not pass through the same phases of growth, or that the growth is more rapid, but merely that when in the grilse stage they generally lack the instinct that impels their more northern relatives to seek fresh water.

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Of the characteristics of grilse, as ascertained in the rivers they frequent, it will be sufficient to say that they exhibit to a great degree the characteristics of the adult; that the main external differences are a shorter head, slenderer form, and a difference in the color and markings; that they are remarkably active and agile, leaping to great heights; that the male is sexually well developed and mates with the adult, but that the female is immature, and that, like the adult, they abstain from food and consequently lose flesh during their stay in fresh water.

PACIFIC SALMON.—There are five species of salmon on the Pacific coast which belong to the genus *Oncorhynchus*, namely, the chinook or quinnat salmon (*O. tshawytscha*), the red or blueback salmon (*O. nerka*), the humpback salmon (*O. gorbusha*), the silver salmon (*O. kisutch*), and the dog salmon (*O. keta*). The features which separate the Pacific salmon from the Atlantic salmon are not marked, and consist chiefly in a larger number of rays in the anal fin, and more branchiostegals, gillrakers, and pyloric cœca.

The characters noted in the following key will usually be sufficient to distinguish the different species of Pacific salmon:

Quinnat Salmon.—Scales in longitudinal series from 135 to 155, averaging about 145; pyloric cœca 140 to 185; gillrakers comparatively short and usually 23 in number, 9 being above the angle; rays in anal fin 16; branchiostegals 15 to 19. Body robust; head conic; eye small; caudal fin deeply forked. Color above dusky, sometimes with bluish or greenish tinge; sides and belly silvery; head dark, with metallic lustre; back and the dorsal and caudal fins with numerous round black spots.

Blueback Salmon.—Scales in longitudinal series about 130; pyloric cœca, 75 to 95; gillrakers comparatively long and 32 to 40 in number; rays in anal fin 14 to 16; branchiostegals 13 to 15. Body rather slender; caudal fin much forked; anal and dorsal fins low. Color, above bright blue, sides silvery, no spots.

Humpback Salmon.—Scales very small, 210 to 240 in longitudinal series; pyloric cœca very slender, about 180 in number; gillrakers short, about 28, 13 being above angle; anal rays 15; branchiostegals 11 or 12. Color bluish above, silvery on sides; hind part of back, adipose fin, and tail with numerous black spots, largest and of oblong form on tail.

Silver Salmon.—Scales large, 125 to 135 in longitudinal series; pyloric cœca comparatively few and large, 45 to 80 in number; gillrakers long and slender, 23 in number, 13 below angle; anal rays 13 or 14; branchiostegals 13 or 14. Body long; head short, conic; snout blunt; eye small; fins small, caudal deeply forked. Color bluish green, sides silvery, finely punctulated; spots few and obscure on head, back, dorsal, adipose dorsal, and upper rays of caudal.

Dog Salmon.—Scales of medium size, 138 to 155 in lateral line; pyloric cœca 140 to 185; gillrakers short and few, 9 above and 15 below angle; 13 or 14 rays in anal fin; branchiostegals 13 or 14. Form of quinnat, but head longer and more depressed. Dusky above and on head, paler on sides; very fine spots on back and sides, often wanting; tail plain dusky or finely spotted, with black edge; other fins blackish.

These salmon are the most important group

of fishes entering the rivers of North America. The steelhead (*Salmo gairdneri*), technically a trout, but popularly regarded as a salmon, also inhabits the waters of the Pacific coast and adds to the importance of the salmon tribe.

In recent years the annual catch of salmon in the Pacific States and Alaska has been over 100,000,000 pounds. In 1899 the quantity of salmon canned was 2,450,000 cases of 48 one-pound cans. The weight of the fresh fish represented by this pack, together with the large quantities sold, fresh, salted, and smoked, was about 175,000,000 pounds, with a value, as placed on the market, of nearly \$9,000,000.

The quinnat is known in various parts of its range as Chinook, king, Columbia, Sacramento or tyee salmon, and is the most important of these salmon. It is not only superior in food qualities, but attains a vastly larger size, has a wider geographical range and a greater commercial value. When fresh from the ocean it is a very handsome, well-formed fish, greatly resembling the Atlantic salmon, although less symmetrical and graceful. It is of a uniform rich red color, becoming paler or streaked upon the approach of the spawning season. Its value for canning purposes is largely enhanced by the persistence of the red color of the meat after cooking. In size no other salmon in the world compares with it. In the Yukon River, Alaska, it reaches a weight of over 100 pounds. Farther south, it runs smaller, although in the Sacramento individuals weighing 50 or 60 pounds are not rare; 22 pounds is a fair average weight in the Columbia River and 16 pounds in the Sacramento. Its known range is practically from Monterey Bay (latitude 36½) to the Yukon River, but it probably ranges farther north. While in the sea, quinnat salmon probably do not wander very far from the mouths of the rivers they have left, and for this reason usually return to spawn in the rivers in which they were hatched. They prefer the larger rivers, like the Sacramento, the Columbia, the Nushagak, and Yukon. They are very persistent in ascending the rivers to spawn, and have been seen crowding up the rivulets which form the headwaters of the Sacramento until nearly half their bodies were exposed to the air. No matter how far the headwaters of a river are from the ocean, some of the salmon will press forward until stopped by impassable obstructions or water too shallow for them to swim in. On reaching the headwaters they remain for a week or two before proceeding to the spawning grounds. Their rate of progress varies with the season, and probably depends to a great extent on the rainfall and the state of the river, rain, roily water, and high water always hastening their progress.

When they first come from the ocean the sexes are almost identical in appearance, but as the time for spawning approaches a difference is noticed between the males and the females, which during the spawning season becomes more marked. The fully developed ova of the female give her a round, plump appearance, while the male grows very thin. His head flattens, the upper jaw curves like a hook over the lower, the eyes become sunken; large, powerful, white, dog-like teeth appear on both jaws, and the fish acquires a gaunt and savage appearance. As soon as they reach fresh water their appetites

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grow less, their throats begin to narrow, and their stomachs to shrink. This does not at first entirely prevent them from feeding, but it changes them enough to enable them to overcome the temptation to return to their well-stocked feeding-grounds in the ocean, and the longer they remain in fresh water the greater are the changes, and the desire to turn back for food is correspondingly lessened. This change comes about gradually, increasing day by day from the time they leave tidewater until at the near approach of the spawning season their throats and stomachs become entirely incapacitated for receiving food, and the desire and ability to feed leave them entirely. The great reserve of flesh and blood which they bring with them from the ocean enables them to keep the vital organs active until their mission up the fresh-water streams is accomplished.

Quinnat salmon, like all the Pacific salmon, do not return to the sea, but die on or near their spawning grounds. After spawning they rapidly deteriorate, the flesh shades off to a light, dirty pink and they become foul, diseased, and much emaciated. Their scales are wholly absorbed in the skin, which is of a dark olive or black hue, and blotches of fungus appear on their heads and bodies, and in various places are long white patches where the skin is partly worn off. Their fins and tails become badly mutilated, and in a short time they die exhausted.

The spawning season of the quinnat varies in different rivers and, considering the entire coast, lasts at least six months. In July the summer run is spawning at the headwaters of the McCloud and Sacramento rivers in California; in August and September, farther down these rivers. In October the fall run has begun in the McCloud and below, and this run continues spawning through November into December. In the Columbia the spawning begins at the headwaters in June; at Clackamas, 125 miles from the mouth of the river, it begins about the middle of September and continues until November. A few days before they are ready to spawn the salmon hollow out elongated cavities with their heads and tails in the gravel beds of the river where there is some current, and here in due time the eggs and milt are deposited. The eggs drift into the crevices in the pile of stones thrown up below the hollow, sink to the bottom, and remain in that protected position during incubation; here, also, the young remain until the umbilical sac is absorbed. The eggs and young are liable to destruction by freshets, but are comparatively safe from other injurious influences. The quinnat is not so prolific as the Atlantic salmon, 300 or 400 eggs to each pound weight of the parent fish being a fair average.

As the salmon ascend the rivers they are caught by gill nets, fyke nets, pounds, weirs, seines, wheels, and other devices, but in the Sacramento and Columbia the greater numbers are caught with gill nets drifting with the current or tide as they head upstream. In the rivers they are comparatively safe from enemies except otters, ospreys, and fishers, but immense numbers are destroyed at the mouths of the streams by seals and sea lions. The quinnat has been introduced into Japan, Australia, New Zealand, and Europe, but efforts to acclimatize

it on the Atlantic coast of the United States have so far been unsuccessful.

Considering the entire west coast the blueback salmon (*O. nerka*) is probably more numerous than all the other salmon combined. It is known in different regions as blueback, redbfish, red salmon, Fraser River salmon, and sock-eye or saw-qui. It ranks next to the chinook in commercial value, being especially important in the Columbia and Fraser rivers and in Alaska. For canning purposes it is but little inferior to the chinook, the color of the flesh being a rich red, which persists after canning. Large quantities are canned in British Columbia and in Alaska, particularly on Kadiak Island, and its commercial importance to that Territory is indicated by the fact that nearly half of the entire salmon pack of the world comes from Alaska and the majority of the fish there canned are of this species. Comparatively few red salmon are sold fresh in the United States. It is next to the smallest of the salmon, the maximum weight being about 15 pounds, but it rarely weighs over 8 pounds and the average is scarcely 5 pounds. In various lakes this fish weighs only half a pound when mature, and is called the little redbfish. It ranges from Humboldt Bay, California, to the far north, but in general it ascends only those rivers which rise in cold, snow-fed lakes. Except in the breeding season the color of this fish is a clear bright blue above, with silvery sides and belly. At the spawning period the back and sides become red, and the male develops an extravagantly hooked upper jaw.

The humpback salmon is the smallest of the Pacific salmon; its average weight is only 5 pounds, and it rarely reaches 10 pounds. Its range is from San Francisco probably as far north as the Mackenzie River, and it is also common on the Asiatic coast. In food qualities the fresh-run humpback is scarcely inferior to any other salmon. While the flesh has a very fine flavor, it is paler than that of other red salmon, and the species has consequently been neglected by canners; but it is probable that it will eventually be utilized for canning purposes, and its excellent qualities when fresh are undoubtedly destined to give it a great commercial value. Its chief consumption now is by Alaskan natives. The humpback salmon generally seeks the smaller streams for the purpose of spawning and deposits its eggs a short distance from the sea, sometimes within only a few rods of the ocean. At Kadiak Island, Alaska, where it is often very abundant, it arrives in the latter part of July, the run continuing only a few weeks. Spawning takes place in August.

The silver salmon is also known as silver-sides, skowitz, kisutch, hoopid salmon, and coho salmon. It is a beautiful fish, having a graceful form and a bright silvery skin. Its flesh, which is fairly good, usually has a bright red color, but as this fades on cooking it is not highly regarded for canning purposes, though large quantities are thus utilized. Its average weight in the Columbia and Puget Sound is 8 pounds, but in Alaska it averages nearly 15 pounds. Its range is from San Francisco to northern Alaska, and as far south on the Asiatic coast as Japan. It runs up the rivers to spawn in fall or early winter, when the waters are high, but usually does not ascend great distances from the ocean.

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The dog salmon is the least valuable of the Pacific salmon, although it is dried in large quantities by the Alaskan natives. Its average weight is 12 pounds and the maximum is about 20 pounds. It is found from San Francisco to Kamchatka, being especially abundant in Alaska. The enlargement and distortion of the jaws give the species a very repulsive look, and the large teeth give to it its common name. When just from the ocean, the flesh has a beautiful red color and is not unpalatable, but it deteriorates rapidly in fresh water. It spawns in shallow rivers and creeks. Larger quantities are utilized in Puget Sound than elsewhere in the Pacific States, and it is also used considerably by the natives of Alaska.

The Steelhead.—Another anadromous salmonoid fish found on the Pacific coast, popularly regarded as a salmon, is the steelhead (*Salmo gairdneri*), known also as hardhead, winter salmon, square-tailed trout, and salmon trout. It resembles in form, size, and general appearance the salmon of the Atlantic coast, and is distinguished from other Pacific coast salmon by its square tail, its small head, round snout, comparatively slender form, light colored flesh, and its habit of spawning in spring. It is more slender than the quinnat and consequently not so heavy for its length. Its average weight in the Columbia is about 10 pounds, although it sometimes reaches 30 pounds. Its range is very extended, reaching from the southern coast of California to the Alaska Peninsula, and is found in almost all the streams of the Pacific States which empty into the ocean. It begins to enter the Columbia in the fall, and is then in prime condition. Like the chinook, the steelhead ascends rivers for long distances, and it has been found almost as far up the tributaries of the Columbia as the ascent of fish is possible. As the greatest quantities of steelheads are caught in the spring, when they are spawning and are in a deteriorated condition, they are not generally esteemed as food; but when they come fresh from the sea and are in good condition, their flesh is excellent. As the demand for salmon has increased, steelheads have been utilized for canning, and they have formed a noteworthy part of the canned salmon from the Columbia River for a number of years past, as well as from the short coast rivers of Washington and Oregon. Their consumption fresh has been increasing yearly and considerable quantities have been sent to the Eastern States in refrigerator cars.

Artificial Propagation.—The first steps in an effort to restock with salmon the rivers of the eastern coast were undertaken by Massachusetts and New Hampshire about 1865. At first eggs were obtained from Canada, but this source was cut off, and the authorities were compelled to attempt to get eggs by capturing salmon in the spring at the mouth of the Penobscot River, in Maine, and keeping them alive and well until they spawned in November. After some experimenting a few live salmon were safely caught and carried in floating cars to Craig Brook, near the mouth of the Penobscot, where ponds and hatcheries fed by a clear stream had been prepared for them. The fish thrived; year by year quantities of eggs were obtained and despatched to other places to be hatched. In 1889, however, the Craig Brook station was acquired by the

U. S. Fish Commission and enlarged into a regular establishment for the rearing of fry, on an extensive scale, to the age of six or seven months. Later other establishments were opened for the rearing and distribution of the landlocked salmon. Still more extensive operations in salmon culture have been undertaken on the Pacific coast to replenish the rivers of California and the Columbia basin, from 40 to 50 millions of fry (principally quinnat) are annually being artificially hatched, reared and placed in the headwaters of the various rivers. For treatment of the eggs and fry, see FISH-CULTURE. See also FISHERIES.

Bibliography.—Goode, 'Fisheries Industries' (Sec. I. Washington, 1884); Day, 'Fish of Great Britain' (London, 1880-4); Jordan and Evermann, 'Fishes of North and Middle America' (Washington, 1898); 'Reports' and 'Bulletins' of the U. S. Fish Commission, especially the 'Manual of Fish-Culture,' and Moser's Report of the operations of the Albatross during 1898.

Salmon, a river in Idaho, which rises in Custer County, flows north and west into Snake River. Its course is irregular; its total length is about 400 miles.

Salmon Dance, among the American Indians, a dance of the Yurok, Karok and other tribes, held in the early spring on the Pacific coast when the salmon begin to run up the rivers. No one is permitted to catch a salmon before the dance, nor for 10 days afterward.

Salmon-trout, a name applied to several distinct species of *Salmonida*: in the eastern United States to the great lake trout (*Cristivomer* or *Salvelinus namaycush*) which resembles the true charrs or trouts except for the crested and toothed vomer bone and prominent teeth on the base of the tongue. The color varies greatly, but is usually dark gray with numerous well separated rounded spots of lighter gray. This species reaches a length of upward of three feet, and has been known to attain a weight of 125 pounds. It is especially characteristic of the Great Lakes, but is found in fresh waters from Maine to Vancouver and northward to Alaska. Except when spawning in the autumn they live in the deeper waters of the Lakes and are extremely voracious. Next to the whitefish the lake-trout is the most important food-fish of the Great Lakes, and is caught chiefly by means of extensive gill nets operated by tugs. In order to maintain the fisheries many millions of eggs are now hatched artificially, both by the United States and by the Michigan Fish Commissions. In the West the steelhead salmon (*Salmo gairdneri*) and related species are sometimes known as salmon-trouts. The steelhead resembles the rainbow trout (q.v.), but is very much larger, has small scales and a larger mouth. It is abundant in nearly all of the rivers of the Pacific coast, from California to Alaska, and is caught in considerable quantities for canning, and, when captured in the fall immediately after leaving the sea, is esteemed as a fresh fish. The common Atlantic salmon (*Salmo salar*) also sometimes receives the name of salmon-trout, as in the Gulf of Saint Lawrence. The salmon-trout of Europe (*Salmo trutta*), also known as bull-trout and sea-trout, occurs in the Baltic Sea.

about the British Isles and along the coast of France, and enters the rivers emptying into these seas. Its life history resembles that of the common salmon, with which it readily hybridizes. See SALMON; TROUT.

Salmond, sām'ond, **Stewart Dingwall For-dyce**, Scottish theologian: b. Aberdeen 22 June 1838; d. there, 20 April 1905. He was educated at Aberdeen and at Erlangen University, was a Free Church clergyman and occupied the chair of theology at the Free Church College at Aberdeen from 1876 till his death. He was appointed principal there in 1898. His publications include: 'The Life of Christ'; 'The Christian Doctrine of Immortality' (1895-1902); etc.

Salmon'idæ, a family of highly organized fresh-water and anadromous fishes of the northern parts of the world, which includes the salmon, salmon-trout, whitefish, grayling and their relatives. See SALMON.

Sal'ol, phenyl-salicylate, $C_6H_4.OH.COOC_6H_5$, a drug obtained by the interaction of salicylic acid and phenol. A white crystalline powder odorless or with a faint aromatic smell, nearly tasteless, almost insoluble in cold water, easily so in alcohol, ether, or chloroform. A powerful antipyretic but chiefly used as an intestinal antiseptic. In the small intestine it is decomposed by the pancreatic juice into phenol (or carbolic acid) and salicylic acid, both of which are well known antiseptics. Used therefore in cases of typhoid fever, fermentative dyspepsia, and in other diseases of the intestinal canal. As it contains salicylic acid it is valuable in cases of rheumatism, gout, etc. Dose from 15 to 30 grains.

Salome, sa-lō'mē, a Hebrew female name, common in Palestine in the days of Jesus Christ. The most notable bearer of it was the granddaughter of Herod the Great, born 10 A.D., who married her uncle, Philip the tetrarch. She appears in the gospel as a young girl, who is instigated by her mother Herodias to ask of Herod Antipas the execution of Saint John Baptist. The name was also borne by the mother of James the Elder and John the Evangelist, one of those women of Galilee who attended Jesus in his journeys and ministered to him. (Matt. xxvii. 56.) She asked of Christ for her sons a special place of honor in his kingdom (Matt. xx. 21) and was a witness of the crucifixion (Mark xv. 20). Some infer, from comparing Matt. and John xix. 25, that she was a sister of Mary the mother of Jesus.

Salomon, Haym, American patriot and financier: b. Lissa, Poland, 1740; d. Philadelphia, Pa., 6 Jan. 1785. But meagre details are preserved of his early career, but his record as an American patriot and his services in aid of the government in Revolutionary days are well known. He was called "the good Samaritan" by S. H. Gay in his life of James Madison, and is referred to by Madison as rejecting all recompense for the pecuniary help bestowed. He was a prisoner in New York in 1775, and in 1778 escaped to Philadelphia. There acquiring wealth as a banker, he freely loaned to Robert Morris over \$350,000. He negotiated all the war subsidies from France and Holland,

and when Continental money was withdrawn, causing suffering among the poor of Philadelphia, he distributed \$2,000 in specie to relieve distress. The large indebtedness of the government to Haym Salomon was never repaid to him nor to his heirs and has been the subject of some discussion. It was favorably reported to the United States Senate in 1850. Although the amount of public securities and Revolutionary papers filed in the register's office, Philadelphia 15 Feb. 1785 reached \$353,744, the inroads of the British army in 1814 destroyed every record in relation to the vouchers. On 24 Feb. 1893 a bill was presented to the House that a gold medal be struck off in recognition of Haym Salomon's services, his heirs to waive all claims for indemnity; but the measure, although reported favorably, was too late for consideration. Consult: 'A Sketch of Haym Salomon, from an unpublished MS. in the papers of Jared Sparks'; H. B. Adams, in 'Publications of American Jewish Historical Society, No. 2' (1894).

Salomons, SIR David Lionel Goldsmith-Stern, English electrical engineer: b. 28 June 1851. He was mayor of Tunbridge Wells in 1895, has been vice-president of the Institution of Electrical Engineers, and has published: 'Electric Light Installations'; 'Photographic Formulæ'; and various monographs on electrical topics.

Salon, sā-lôn', **The Paris**, (1) the large gallery in the Louvre, in Paris, in which art exhibitions were formerly held; (2) a name given the annual art exhibition in Paris; (3) the leading galleries where modern artists exhibit their works. See PARIS.

Saloniki, sā-lō-nē'kē, or **Salonica** (ancient, THESSALONICA), Turkey in Europe; (1) a seaport and the capital of a vilayet, on the gulf of the same name, in the Ægean Sea, 315 miles southwest of Constantinople. It occupies a fortified slope, and, surrounded by stately cypresses and lofty white walls, ascends from the shore in triangular form. Its architecture is characteristically Oriental, the early Christian churches having been converted into mosques. Chief of these is Saint Sophia, similar to the celebrated mosque of that name in Constantinople, on a smaller scale, but beautiful; the church or mosque of Saint George (with walls 20 feet thick), which contains early Christian mosaics dating from 400 A.D.; Saint Demetrius, with a fine interior; and various others, besides Greek churches and Jewish synagogues. The numerous antiquities include the Citadel, or ancient Acropolis, with its seven towers, called by the Turks *Vedi-Kuleh*, containing a triumphal arch which dates from the time of Marcus Aurelius; the Propylæum of the Hippodrome, a splendid Corinthian colonnade of five pillars; the triumphal arch of Augustus, commemorating the battle of Philippi; the arch of Constantine, etc. There are large bazaars, and aqueducts bring water from the distant hills to the city. Saloniki, however, is also characterized by much squalor and miserable quarters. Since the construction of various railway systems, and harbor improvements, the trade, already considerable, has increased. The exports consist of corn, cotton, wool, tobacco, silk cocoons, opium,

SALPA—SALT

wine, brandy, skins, antimony, and timber; the imports, of sugar, flour, coffee, coal, iron, and hardware, petroleum, salt, rice, glass, etc. Great Britain has the largest volume of trade; next in importance are Italy, France, Austria-Hungary, and Turkey. Salonica (formerly Therna) is mentioned in historical annals, in connection with Xerxes' march through Greece. It was rebuilt by Cassander in 315 B.C. St. Paul preached here, and addressed two of his epistles to the converts of this place. During the Roman-Macedonian wars it figured as the chief station of the Macedonian fleet. After the civil wars it became the first city in Greece. It was a seat of the Christian Church at a very early period. During the barbarian invasions, it was the most important stronghold and place of defense of the Eastern empire. In mediæval times it was taken (904) by the Saracens; (1185) by the Sicilian Normans; (1430) by the Turks. Many of the inhabitants are Jews and Greeks. Pop. (1910, estimated) 150,000. (2) The Gulf of Salonica (ancient Sinus Thermaicus) is the extreme northwestern arm of the Ægean Sea, between the peninsula of Chalcidice and the coast of Thessaly. It has a length of about 85 miles, a breadth of 35 miles, and consists of two distinct parts—one wide, extending from south-east to northwest; the other narrow, from south-west to northeast.

Sal'pa, a genus of free-swimming ascidians of the order *Thaliacea*, and the family *Salpidae*. They are met with as single or solitary organisms and as compound collections, the so-called "salpa chains." The solitary salpa produces by budding from a process termed the stolon, a long chain of aggregated embryos, which become the salpa chain. The individuals of this compound chain have the power of producing, by means of eggs, new solitary salpæ. The entire life-history, however, is not so much one of an alternation of generations as of a process of budding (asexual), alternating with reproduction by means of eggs (sexual). Each salpa is of oval or quadrate form, with an aperture at either extremity. Locomotion is effected by the expulsion of water from the posterior aperture, and the salpa-chains thus swim over the surface of the ocean. The principal organs of the body are compacted to form the so-called "nucleus." The salpæ are beautifully transparent and colorless and often phosphorescent. They abound in the waters of the Gulf Stream and in the Mediterranean.

Sal'sify, a biennial composite (*Tragopogon parvifolius*), sometimes attaining four feet in height. It grows wild in the south of Europe, but is cultivated as a vegetable. It has narrow grass-like leaves and solitary showy purple heads of ligulate florets, the involucre consisting of lanceolate leaflets much longer than the florets. The flowers close before noon. The fruits are plumed, and float through the air like those of a dandelion. Salsify is hardy, and has a very long tapering tap-root, white and fleshy, and with a flavor resembling oysters, whence it is sometimes called vegetable oyster or oyster plant. Black salsify (*Scorsonia hispanica*) comes from Spain, and is closely allied to the true salsify. It has a root like that of *Tragopogon*, except that it has a blackish skin. The leaves are undulate, and the flowers yellow. The plant was once used for snake-bites.

Salsif'ia, the common name of several species of the amaryllidaceous genus *Bomarea*, which produce edible tubers. Some are cultivated in greenhouses for their large gorgeously spotted flowers, borne in cymes on twining stems, and *B. edulis* is cultivated in the West Indies as a vegetable, its fleshy roots being also a diuretic and sudorific.

Sal'sola, a genus of the *Chenopodiaceæ*, with about 50 widely distributed species growing in saline soils, or on seashores. The small, axillary flowers are apetalous, but have a five-parted calyx, which in fruit encloses the utricle, and has a broad, horizontal, membranous wing. A maritime species (*S. kali*), the prickly salt-wort, is a familiar spiny annual, its decumbent branches, spreading from the central tap-root so as to form large rosettes on the sand. The closely-set rigid leaves radiate in all directions; they are small, awl-shaped, and succulent, the mid-vein ending in a strong prickle. It is a widely diffused species, and like some other plants of the same family, was formerly collected and burned for the impure carbonate of soda found in its tissues. Lumps of the fused ash were an important article of commerce, called barilla (q.v.), and yielded about 50 per cent of soda, being the original source of that chemical. Salsola was also a component of the "sope," mentioned by Jeremiah. To this genus also belongs the Russian thistle (q.v.).

Salt, salt, Henry Stephens, English biographer: b. Nynce Tal, India, 1851. He was educated at Cambridge and subsequently engaged in literary work and social reform. He has been honorary secretary of the Humanitarian League from its founding in 1891, and editor of 'The Humanitarian' and 'The Humane Review.' He has published: 'Life of James Thomson'; 'Life of Thoreau'; 'Richard Jefferies: a Study'; 'Shelley: Poet and Pioneer'; 'Animals' Rights'; 'The Logic of Vegetarianism'; etc.

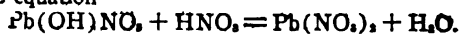
Salt, SIR Titus, English manufacturer: b. Morley, Yorkshire, 20 Sept. 1803; d. 29 Dec. 1876. He was the first to introduce the manufacture of cloth from the wool of the alpaca into England. The model village of Saltaire (q.v.), three miles from Bradford, on the river Aire, was built in 1853 for the workmen engaged in his factories. He was a member of parliament in 1859, and in 1869 was made a baronet. Consult: Balgarnie, 'Life of Sir Thomas Salt' (1877); Holroyd, 'Saltaire and its Founder.'

Salt, the common name for sodium chloride, NaCl. It occurs native in large quantities, and it may also be prepared by neutralizing hydrochloric acid with sodium carbonate or with sodium hydrate, and evaporating the solution. It is soluble in water, its solubility at the boiling point being only a little greater than the solubility at the freezing point. It is insoluble in absolute alcohol, and in aqueous alcohol it dissolves to a greater or lesser extent, according to the proportion of water present. Salt crystallizes in the isometric system, usually in cubical or pyramidal forms, though octahedra also occur. Its solution is neutral to test papers, and a saturated solution, when cooled to some degrees below the freezing point of pure water, deposits a hydrate having the composition

SALT

$\text{NaCl} + 2\text{H}_2\text{O}$. When cooled to 9°F. below zero, a saturated solution throws down the hydrate $\text{NaCl} + 10\text{H}_2\text{O}$. Pure salt is ordinarily white in color, but it is transparent and colorless, with an ice-like lustre when crystalline. It is slightly hygroscopic, and when heated it decrepitates markedly. It melts at about 1500°F. , and it may be vaporized by raising it to a strong white heat in a current of nitrogen gas. Its specific gravity is 2.16, and its specific heat is about 0.214. Salt is far more transparent to radiant heat than glass is, and physicists therefore employ prisms and lenses of clear rock salt in experiments upon the infra-red rays of the spectrum. (Consult, on this point, Tyndall, 'Contributions to Molecular Physics in the Domain of Radiant Heat.') Salt, from its abundance, is greatly used in the arts as a source of chlorine and of sodium. (See CHLORINE and SODIUM.)

In chemistry, a general name for any compound which may be regarded as consisting of an acid with its hydrogen partially or wholly replaced by one or more metallic bases, or by basic radicals; or for a compound consisting of a basic substance whose hydrogen has been more or less completely replaced by acid radicals. Ordinary sodium chloride, NaCl , for example (which is the substance commonly known as "salt" about the household), may be regarded as hydrochloric acid, HCl , in which the hydrogen has been replaced by sodium. Acetamide, $(\text{C}_2\text{H}_5\text{O})\text{H}_2\text{N}$, is a "salt" in accordance with the second portion of the definition, since it may be regarded as consisting of ammonia, NH_3 , in which one atom of hydrogen has been replaced by the monovalent radical "acetyl," $\text{C}_2\text{H}_5\text{O}$, of acetic acid. Simple chemical salts are classified, for convenience, as "acid," "normal" and "basic." An "acid" salt is one whose acid radical still contains one or more atoms of replaceable hydrogen; while a "normal" salt is one which contains no replaceable hydrogen. When sulphuric acid (H_2SO_4), for example, reacts with salts of potash, the potassium may replace half of the hydrogen of the acid, or all of it. In the former case we have the compound KHSO_4 , which is known as "acid sulphate of potassium"; and in the latter case we have the compound K_2SO_4 , which no longer contains hydrogen, and which is therefore called the "normal" sulphate. The acid salt may be regarded as an intermediate stage between the original acid and the "normal" salt. A "basic" salt is one which contains one or more molecules of hydroxyl, or of a metallic oxid, which can be replaced by an acid radical with the formation of a normal salt. A basic salt may therefore be regarded as intermediate between the base and the normal salt. Comparatively weak bases, such as lead and bismuth, form basic salts, but powerful bases like lime and soda do not. Lead, for example, forms a basic nitrate having the composition $\text{Pb}(\text{OH})\text{NO}_3$; and when this is treated with nitric acid (HNO_3), the hydroxyl is replaced by an " NO_3 " radical, as indicated by the equation



A salt which contains two different basic or acid radicals is called a "double salt." Ordinary sodium-potassium tartrate, or "Rochelle salt," $\text{KNaH}_2\text{C}_4\text{O}_6 + 4\text{H}_2\text{O}$, is an example, and so

also is strontium aceto-nitrate, $\text{SrNO}_3(\text{C}_2\text{H}_3\text{O}_2)$. The phenomena which occur when two normal simple salts combine to produce a double salt are doubtless quite complicated in some instances. The double salt $\text{MgSO}_4 \cdot \text{K}_2\text{SO}_4$, which is formed by the combination of the normal sulphates of magnesium and potassium, appears, when in solution, to be a simple mixture of the two constituent normal sulphates; but, on the contrary, the double salt $\text{PtCl}_4 \cdot 2\text{NaCl}$, which is formed by the union of platinum chloride (see PLATINUM) and sodium chloride, acts as though it were the normal sodium salt of an acid having the composition H_2PtCl_6 .

Physiological Uses of Salt.—Salt as a universal commodity has been used in all ages and civilizations. In biblical times the Jews offered salt to Jehovah with the first fruits of the harvest and the fruits of the earth; Homer calls it divine and chronicles its use in the repasts of his heroes; Tacitus tells of furious wars between the Germanic tribes for the possession of salt springs near their territories. Mungo Park saw the inhabitants of the coast of Sierra Leone give all that they possessed, even their wives and children, to obtain a salt supply. Salt is, in fact, an object of so general consumption, so necessary to man, that it affords an assured medium of exchange. The need for salt is not confined to man. Many animals seek this substance with avidity. Nothing pleases the appetite of sheep more than salt. Cattle may suffer cruelly from a lack of salt, and that, on the other hand, they thrive when it is added to their ration. Reindeer and red and roe deer love to lick the surface of brackish puddles and saline efflorescences. In all climates, in all latitudes, wild ruminants and other hoofed animals resort to salt licks, a circumstance of which hunters take advantage, choosing their shooting covers either where salt naturally effloresces or where they themselves have scattered it.

Salt was first used as an aliment at the time of transition from the pastoral and nomadic stage to sedentary and agricultural life. The Indo-European languages have no common word to designate salt, nor have they any for the greater number of the objects that relate to agriculture. But, on the other hand, they have common roots for all words relating to pastoral occupations. This is an indication that the primitive peoples from which modern races sprang were separated before they abandoned a pastoral life. They did not learn the art of agriculture until later, and with it they learned the use of salt. There are populations, ethnic groups, and castes that have never adopted it. The Egyptian priests did not salt their food. Plutarch was astonished at this strange disdain. And in the same way there are animals of the farm that are very fond of it, the dog and cat that do not care for it at all.

There is a well-established relation between a vegetable diet and the need for salt, and reciprocally between an animal diet and the exclusion of this article from food. The two kinds of diet, however, are not distinguished from each other by the quantity of salt which they contribute to the organism. In fact, both kinds are very poor in salt. Although both contain equally small quantities of chloride of sodium, they are distinguished from each other by another mis-

eral product which they possess in an unequal though considerable degree. This is potash. In marked contrast with common salt, this substance, always abundant, varies greatly in its relative quantity in different kinds of food. There are foods that contain a great deal of it, and these are precisely those that are taken from the vegetable kingdom. Plants are generally distinguished by their richness in potassic salts. They accumulate enormous quantities of them, drawing them from the poorest soils. Inversely there are other aliments derived from animals that are generally relatively poor in these compounds. In fine, the capital difference that distinguishes in the eyes of the chemist the two modes of diet, is the abundance of potash in the vegetarian ration and its deficiency in the meat ration. The information given by chemical analysis may be succinctly stated as follows: The vegetable kingdom furnishes the economy with much potash and very little soda—about 25 to 150 times more potash than soda. On the other hand, the animal kingdom reduces the supply of potash without reducing in the same degree the supply of soda. It introduces into the economy no more than 2 to 5 times as much potash as soda. All this is perfectly true and interesting in itself, but what hidden relation is there between the proportion of potash that distinguishes the two diets and the inequality in the need for salt which they produce. M. Bunge believes that he has discovered this relation. His hypothesis is that potash is responsible for the like or dislike of salt in cookery. This he justifies by a series of closely connected inductions. The need for salt is the consequence of the loss of salt from the organism, as thirst is the consequence of the loss of water due to hemorrhage, transpiration, or other causes. The need for salt implies a previous loss of salt. Secondly, the loss of salt should be a phenomenon of a chemical nature resulting from reactions of disintegration. Thirdly, this chemical phenomenon having, as is proved by experiment, a relation to the different kinds of diet, should be caused by their chemical characteristics—that is to say, by the difference in their proportions of potash. Contrary to M. Bunge, it is claimed by other chemists that an exclusive vegetable diet causes a need, a particular appetite, which can be satisfied by substances having the taste of cooking salt and containing either chloride of sodium or chloride of potassium. In brief, from a chemical point of view, it is a need for chlorides; from a physiological point, a need for salty savor; that is to say, for a particular kind of gustative sensation.

Condiments and seasonings are found to have a justification that is to some degree of a physiological character. They insure the proper action of the stomach. Salt does more. At the same time that it puts in motion the secretion of the stomach it furnishes it with materials, at least with some of them. Hydrochloric acid, which is characteristic of the gastric juice and insures its digestive efficacy, is derived from salt, from the chloride of sodium of the blood. The same origin should be ascribed to the chlorine compounds found in the juices of the stomach, fixed chlorides and organic chlorine. In other terms the material for the chlorine compounds of the gastric juice

comes primitively from the salt of our food. Ordinary salt, the chloride of sodium, is one of the constituent elements of animal organisms, existing everywhere in them: The blood has a saline taste more or less marked; all the secretions are salty; the tears themselves are more salty than bitter, whatever good people may say about them. Salt water, in fact, bathes all living particles and leaches continually from the organic structure, escaping from all its tissues, carrying with it the waste matters which should be rejected from the body. Common salt is more suitable than any other for this purpose. In a dose of 9 grams per 1,000 it forms a solution innocuous to the anatomical elements, that can circulate around the most delicate of them without causing the least damage. This close association with salt has become habitual to them from immemorial usage; they have adapted themselves to it, and it would lead to some inconvenience if another mineral constituent should be too abruptly substituted for it. In certain animals that have been led to exhaustion, life may be kept up for some time if the blood is replaced by a saline solution, named, because of its properties, the physiological solution. A turtle or a frog in whose veins this fluid circulates continues to live for a considerable time.

According to statistical data the daily consumption of salt in Europe is on the average 17 grams per capita. Of these about 2 grams are necessary to cover the loss by dissimulation. These two grams represent nutritive salts. The remaining 15 grams would then represent on the one hand 8 to 10 grams carried away by excretions and necessary for restoring the constitution of the circulating liquids, and a surplus; but, considering the influence of salt upon the secretions, it would not be prudent to say that this surplus is a sacrifice made to the pleasures of appetite.

Besides taking an active part in certain of the vital phenomena, common salt fulfils better than any other substance the conditions of a medium that is indifferent and yet suitable for the physiological necessities of living matter. In animals as well as in plants, in the mobile corpuscles of the blood as well as in the fixed elements of the tissues, living protoplasm is always rich in potassic salts. The interior medium which bathes it abounds, however, in sodic salts, particularly the chloride of sodium, resembling in this respect sea water, which might, if properly diluted, circulate in the veins and replace for a time the plasma of the blood, as we have seen may be done with the physiological solution. Some naturalists, recalling the circumstances under which life appeared on the globe, and the manner in which it was for a long time maintained in the saline waters of the Palæozoic seas, have thought they perceived in this fact the survival of an ancestral condition. From this point of view chloride of sodium would be an element handed down from remote times, belonging to a medium suitable to animal life, to the blood and to the organic humors; and salted food, by introducing it about the anatomical elements of the body, would recall the marine origin of animal life, would connect, as one may say, the physiology of the present with that of the past.

SALT DEPOSITS—SALT INDUSTRY

Salt Deposits, Formation and Geology.
See SILURIAN SYSTEM.

Salt-glazing. See GLAZING.

Salt Industry, The. The history of the manufacture of salt in this country is somewhat obscure in its early dates, but covers the entire period subsequent to the settlement of the colonies by the English. The early processes of making salt, which was first produced in this country in Virginia prior to 1620, consisted of exposing sea-water to the rays of the sun or by boiling it in pans or kettles till the salt had settled to the bottom. Later these same processes were used in extracting salt from the natural salt springs, but at the present time sea-water is little used for this purpose. Instead wells are sunk into the salt body, fresh water pumped into them, and when thoroughly saturated is pumped out again, the salt extracted from the brine thus produced. There are several methods of extracting salt from this brine, kettles, open pans, vacuum pans or grainers in which the brine is placed, being heated either directly or by steam. Where kettles or open pans are used, the brine is usually boiled by direct heat, whereas in the grainers and vacuum pans steam heat is used. In the grainer process the brine is evaporated from rectangular vats about 12 inches deep by means of coils of pipes suspended in them and carrying either live or exhaust steam; when the brine is evaporated, the salt is removed from the bottom of the pan by mechanical scrapers. Solar salt is made in vats or ponds, covered and uncovered, and rock salt is mined and is now produced in greater quantities than solar salt.

There are several grades of salt prepared for the market in the United States: Rock, solar, common fine, common coarse, all of which are not dried by artificial means after manufacture; and so-called "dairy" salt, used more especially in the manufacture of butter and cheese. (See SALT; SILURIAN SYSTEM.) The statistics of the industry as given in the 1905 Census are as follows:

	1905	1890
Number of establishments.....	146	200
Capital.....	\$25,586,282	\$13,437,749
Clerks, officials, etc.....	418	200
Salaries.....	487,425	\$189,049
Wage-earners.....	4,666	4,255
Wages.....	\$2,066,399	\$1,593,442
Miscellaneous expenses.....	1,235,579	874,183
Cost of materials used.....	4,166,137	1,826,779
Value of product.....	9,437,662	5,484,618

The table at the top of the next column shows the quantity of salt produced by states for the years 1890 and 1905.

For purposes of comparison the salt industry will be described according to states.

California.—The Spaniards, Mexicans and Indians first gathered salt in this state from the "tide lands" along the shores of Alameda Bay, the natural sinks or ponds there retaining the water which was evaporated by the

sun, thus leaving the salt. No attempt was made to improve the quality of the salt till 1864, at which time the Crystal Salt Works

STATES AND TERRITORIES	1909	1890
	Number of barrels of salt manufactured	Number of barrels of salt manufactured
Kansas.....	2,769,849	1,140,799
Michigan.....	9,966,744	3,729,110
New York.....	10,914,255	3,226,250
Ohio.....	3,684,775	409,514
California.....	886,564	255,328
Texas.....	409,315	.....
Utah.....	246,935	626,429
Porto Rico.....	166,790	.....
West Virginia.....	150,492	285,461
Virginia.....	151,391	.....
Nevada.....	16,107	25,250
Hawaii.....	7,796	.....
Idaho.....	793	.....
All other States.....	887,231	536,319
The United States....	30,107,646	10,406,860

were built. These works consisted of ponds for receiving and settling the sea-water so as to precipitate the gypsum and other impurities less soluble than the salt. After the salt itself was precipitated, the mother liquor, or bittern, was drained off leaving a salt of high quality, which was gathered up and conveyed to the warehouses. Thousands of tons of salt are taken to refining works in San Francisco, where it is subjected to artificial heat for the purpose of more thoroughly drying it, and ground into various forms used in chlorination works, packing-houses and silver mills, and for table and dairy use. The principal salt works in California are located on San Francisco Bay, under the management of the Federal Salt Company, but there are other works located at Salton, in Riverside County; National City, in San Diego County; near Danby, in San Bernardino County; and from the saline springs near Sites, in Colusa County, and at Black Lake, in San Luis, Obispo County, a small quantity of salt is annually produced. In 1909 the total production in California was valued at \$558,889.

Illinois.—There is only one establishment in Illinois, located at Saint John, Perry County, which in 1909 produced but a small quantity of salt.

Kansas.—The first salt produced in Kansas came from the marshes scattered over the central part of the state, along the banks of which crude factories were engaged in the business till 1868, but these were in time superseded by others of a more modern character. In 1867 wells were sunk at Solomon City and a plant erected for the purpose of drying the brine which had been struck at about 75 feet. In 1874 William Dewar established a plant in the same city, using the solar system of drying. The manufacture of salt was not very extensive prior to 1880, when 2,000 barrels were made; by 1890 this amount had increased to 1,140,799 barrels, and in 1900 to 1,645,350 barrels. The greater

SALT INDUSTRY

portion of the salt made in 1900 was evaporated by the grainer and open pan methods, though a small amount was made by solar evaporation. In the development of the coal and petroleum industries in 1887, rock salt was struck near Hutchinson. In the same year a body of salt was also struck at Lyons, in Rice County, by a party of prospectors in search of oil or natural gas. In 1890 a company was formed and a shaft sunk, the drill penetrating the body of salt at 800 feet and passing through the bed to a further depth of 265 feet, making the total depth of the mine 1,065 feet. On sinking this shaft through the bed of salt, 15 workable veins, ranging from 4 to 18 feet in thickness, and alternating with layers of shale from three-quarters of an inch to five feet in thickness, were penetrated. In mining this salt, mining or channeling machines operated by compressed air are first used to undercut the salt; holes are made by air drills, dynamite inserted and exploded by electricity, thus bringing the salt to the bottom of the mine. It is then removed from the mine to the mill above ground, crushed and separated into nine different grades by passing over screens. It is then stored in bins ready for shipment or to be loaded on railway cars. The quantity of rock salt produced in 1900 in Kansas was valued at \$782,676.

Louisiana.—Until 1898 nearly all the salt produced in Louisiana came from Avery Island, where the first attempt to make salt in the state was made in 1791 by John Hays. The first shaft sunk on Avery Island was eight by eight feet and 83 feet deep. This was afterward leased to the American Salt Company, which continued it to a depth of 190 feet. In 1897 a new shaft, 500 feet deep, was sunk near the old one, and the new works were equipped with the most modern appliances. In 1898 a shaft was sunk on Belle Isle by the Gulf Company, of Morgan City, but water by dropping through the roof forced the abandonment of this, and a new one was sunk near it, an evaporating plant erected, and a considerable quantity of salt produced by the grainer process. Mining of rock salt was begun in May 1862, 10 pits being dug, but the works were in operation only 11 months. The entire production of salt in Louisiana in 1900 was so small that it was included in that of "Other States." The largest single mine has long been the Petite Anse.

Michigan.—An appropriation of \$3,000 was made on 4 Mar. 1838 by the state for experimentation by the state geologist, and other work was done in 1840, 1841 and 1842, but no well was sunk till 1859 when a private corporation established a plant at Saginaw. During the year 1860, 472 barrels were produced and was gradually augmented, but irregularities in manufacture soon compelled the establishment of a state salt inspection bureau, and the salt manufactured was regularly inspected by the state official. In 1909 the production was valued at \$2,732,556.

Nevada.—In 1909 there were only three establishments in the state, the product being made from brine springs by solar evaporation. In that year the production was valued at \$19,847.

New York.—The manufacture in New York by white men was begun in 1788 in the Onondaga district. In 1797 the state assumed control of this reservation, maintaining it until 1898 when the title was sold because of the great expense of keeping up the works. During the first 44 years only boiled salt was made in the district, but in 1841 solar salt was also made. In 1883 the Warsaw district was opened up and about the same time the Genesee district began producing. In 1885 rock salt mining was begun near York, Livingston County; in 1892 shafts were sunk at Livonia and Greigsville in the same county; but at the present time the industry is carried on by one company. In 1909 the production of common salt amounted to 6,378,451 barrels, and of rock salt 4,535,804 barrels, both being valued at \$2,646,736.

Ohio.—Saltmaking was first attempted in 1798 at the Old Scioto Salt Works on the Salt Creek, in Jackson County. These continued till 1808 when the management was taken over by the state under the direction of the state superintendent, but as they became unprofitable as a state institution, they were later sold. It was not till 1825 that the other properties in Ohio were developed. The principal grades of salt made are table, dairy and common fine, made in 83 grainers, 38 open pans, 31 kettles and 5 vacuum pans. Four covers or ponds also produced solar salt. The total production in 1909 was valued at \$993,700.

Oklahoma.—The first works were established in 1896, near Okeene, on a branch of the Cimarron River, and this was soon followed by three others, the total amount of the output of the four in 1909 being scarcely worth reporting.

Pennsylvania.—The salt industry was established in the Conemaugh River Valley early in the 19th century. About 1810 William Johnson commenced boring on this river near the mouth of the Loyalhanna, and was soon followed by many others. In 1812 salt was discovered near the present site of Saltsburg, in Indiana County, and by 1820 there were 32 pans and 190 kettles in operation in this county; Armstrong County had 38 pans in operation; Erie County 18 kettles of 32 gallons each and Westmoreland County six establishments producing 70,000 bushels. In 1909 there was only one establishment in the entire state, the total output being included in "Other States."

Texas.—The first well was sunk at Colorado in 1884, followed by another in 1889, and by a third in 1899. The total product in 1909 was 409,315 barrels, valued at \$260,286, the greater portion of the production being made in grainers or open pans.

Utah.—The first salt was harvested in 1848 from the shores of the Great Salt Lake. In 1900 the production amounted to 246,935 barrels, nearly all of which was made by the solar evaporation process. About 1860 the chlorination process for the reduction of silver from its ores was discovered, and salt for this purpose, produced at the Great Salt Lake, was first used at the Alice Mine in Butte, Montana.

Virginia.—The only factory in this state is located in Saltville, in the valley of the Shenandoah River. The production in 1909 was unusually small; the larger portion of this

SALT LAKE CITY

was used in the production of soda-ash, bicarbonate of soda, etc., by an electrolytic process.

West Virginia.—The principal points at which salt has been manufactured in this state are: Charleston, on the Kanawha River; Hartford, Mason City, Clifton and other places in Mason County, along the Ohio River; and near Birch on the Elk River; but the seat of the industry at the present time is in Mason County, only one of the four establishments in operation being outside. The first salt furnace in Kanawha County was erected in 1797, by a Mr. Brooks. On 1 Nov. 1807, David and Joseph Ruffner began boring for salt on the land which is now the present site of Charleston, on 15 Jan. 1808 struck a large stream, and on 8 February secured their first output. By 1817 there were 30 furnaces and 15 or 20 wells in operation, which number had increased in 1835 to 40 furnaces. In 1849 Williams & Stevens erected the first salt furnace on the Ohio River at West Columbia; in 1854 another was erected by Hartford, Conn., parties; a third was erected at Mason City; and within a few years 10 more were erected, but the development of the industry in other states injured the trade in this state so much so that in 1910 there were only four in operation. The total output in that year was 150,492 barrels, valued at \$76,463.

Salt Lake City, Utah, capital of the State; the central seat of Mormon power; the metropolis of the State and centre of trade for a vast region, is finely located on a gentle slope at the western base of the great Wasatch range of mountains. The magnificent mountains behind the city, the lovely valley in front, the stately Oquirrh Range beyond the valley and Great Salt Lake, 20 miles to the northwest, add immensely to the attractions of the city. The population numbers approximately 70,000. The first settlement on the site was made by the immigrants who came in the first immigration, under the leadership of Brigham Young, and reached the valley on 24 July 1847. The elevation of the site above sea-level is 4,300 feet. The main portion of the city is laid out in blocks of ten acres each, the streets run at right angles and are 132 feet wide. Being in the arid belt, all vegetation depends upon irrigation, but nevertheless, it is a city of gardens, shade-trees and flowers. The city is a central station for the Rio Grande Western Railroad, the southern terminus of the Oregon Short Line Railroad, the eastern terminus for the San Pedro, Los Angeles, and Salt Lake Railroad, and roads from San Francisco Bay running east and from Denver running west, now under construction, will meet in Salt Lake about 1907.

The Mormons.—Since 1847, Salt Lake has been the headquarters of the Church of Jesus Christ of Latter Day Saints (see MORMONS), the home of the President and many of the high officers of the Church; the place where the semi-annual general conferences of the Church meet in April and October. The Temple, the Tabernacle and Assembly Hall (for winter services and for priestly meetings and consultation), with the Temple Annex, occupy a square. The Tabernacle is a unique structure, 150 feet by 250 feet in size, roofed like a bee-hive, the roof arches being without support over the structure, with comfortable seating capacity for 8,000 peo-

ple, though not unfrequently 12,000 people gather there. It has the finest pipe organ in America. It is the chief place of worship for the Mormon people, though each of the wards of the city has a meeting-house where services and Sunday schools are held every Sabbath morning, and evening meetings during the week. The Temple is one of the most splendid structures in America. Its walls are of gray Wasatch granite, in solid blocks 9 feet thick at the bottom, 6 feet thick at the top, with a foundation 16 feet thick and 16 feet deep. The interior is finer than was Solomon's Temple. The building is 186½ feet long by 99 feet wide, and is 107½ feet high from foundation to cap stone, while towers and pinnacles extend 50 feet higher. The ground was consecrated and work begun in 1853, it was finished and dedicated in 1893. It is used for marriages, baptisms, and all the secret rites and ceremonials of the Mormon Church. Since its dedication only the faithful are permitted to enter it. Its cost, with furnishings, about \$4,000,000.

Public Buildings.—The city has many other fine structures. The joint City and County Building, which is also the present State Capitol, is a most attractive building and cost with furnishings \$800,000. The Mormon Church authorities are clearing ground for the erection of their Administration Building. It will be 330 feet square and 12 stories high. Though to be called the "Administration Building," it will really be a Memorial building to Joseph Smith, the Prophet, and the very highest in architecture and art will be invoked to make it a glorified monument. It is expected that six years will be required in which to complete it. The fine building of the United States Government is nearing completion. The city has many imposing business blocks, some of the homes are palatial; the public school-houses are among the noblest in the country. Both the Episcopal and Catholic denominations have great hospitals; the Latter Day Saints have a commodious hospital; there are three private hospitals while a Home for poor and needy miners, built by the charity of Mrs. Mary Judge, and the Saint Ann's Orphanage, built on the charity of Senator Thomas Kearns, are noble structures. The first known surgical operation for the removal of gall stones was performed in Holy Cross Hospital, Salt Lake City. The Latter Day Saints' College occupies several imposing structures, one of which is a Memorial Hall built in honor of Brigham Young. The Utah State University has a commanding site on the Bench east of the city. The Military Post of Fort Douglas is three miles east of the centre of the city at an altitude 600 feet above Main Street.

Government.—The government consists of a mayor, a council of 15 members, a treasurer, recorder, auditor and two judges elected every two years. The chief of police, fire chief, board of public works, water master, board of health, city physician and building inspector are appointed by the mayor and confirmed by the council.

The city has warm springs within its limits, and the hot springs four miles out, are equal in medicinal virtues to those of Eureka, Ark. In the bathing season trains run every few hours to Great Salt Lake, 25 minutes' ride. The city owns its own water system. A private monopoly owns the light, the electric power plant

SALT LICK

and street car franchises of the city. The car company operates 135 miles of electric road.

Trade and Commerce.—The trade of the city is very great, extending over Utah, western Wyoming, southern Idaho and eastern Nevada. The great mining districts of Park City, Big Cottonwood, Tintic, Bingham, Mercur, and Ophir, are none of them more than three or four hours' ride from the city; the great smelters are in the valley only eight miles away, and Salt Lake is the general depot and clearing-house for their business. The miners from all over Utah and far into Nevada and Idaho send their ores to Salt Lake smelters for reduction, and purchase their supplies in the city. The bullion purchased in the city aggregates \$15,000,000 annually. There are ten banks in the clearing-house, five savings banks and several loan associations. The total clearings for all the banks in 1909 amounted to \$322,326,200. The Salt Lake Mining and Stock Exchange one year, sold 10,169,741 shares that aggregated \$6,165,323.15. The Lehi Sugar Factory, the chief ownership and business of which is in Salt Lake, one year made from 70,000 tons of beets, 23,000,000 pounds of sugar. The Salt Works on the lake shore and owned in the city, manufacture annually 60,000,000 pounds of salt valued at \$300,000. The Zion Co-operative Mercantile Institution sold goods last year to the amount of \$4,096,278. The product of its shoe factory amounted to \$200,000.

Education.—The public schools of Salt Lake are an interesting feature of the city. The law requires the attendance of all minors (6 to 18 years) for a fixed number of months annually. Books to pupils are free. The schools are governed by a board of education of 10 members. The board and superintendent are elected by the people biennially. There are 23 school buildings. In 1903, 15,987 pupils were enrolled, 13,000 attended the primary and grammar schools, 900 the high schools. The curriculum covers all branches taught in the best schools of the country, including music, dancing, sewing and manual training. In the high schools military training is insisted upon during the first and second years; and students are fitted for any of the universities of the country. In the graded schools 310 teachers are employed; in the high schools 35. Teachers' wages are from \$40 per month to \$125. The rule is to increase the salaries of the younger teachers from \$20 to \$40 per annum until the maximum wage is reached. In the schools one or more teachers came from practically every State in the Union. One public school building is just being completed at a cost of \$120,000. The annual expense for schools is over \$200,000. The value of the school property is \$1,216,664.80 or about 4 per cent of the total valuation of property in the city. Cost of maintaining schools per annum \$206,437.50, cost of books \$26,120, cost, based on enrolment \$24.90 per capita, cost per capita for books \$1.95.

Religion.—The great majority of the people are Latter Day Saints. They have over 30 places for public worship. But 35 years ago, the Roman Catholics established a mission in Salt Lake, a little later built a church and hospital. They now have charge of the great Holy Cross Hospital, the Saint Ann Orphanage, the Miners' Home, Saint Mary's Academy,—All Hallows College for boys and young men, and their new cathedral, one of the finest and largest

in the west, is drawing near completion. A Protestant Episcopal Church was founded in Salt Lake in 1867, and two years later a hospital. It now conducts the hospital, has a church and a cathedral and carries on Rowland Hall, a modern high-class seminary for girls and young women. The Methodists came in 1869. They have five churches in the city, and a number of lesser structures where only the Scandinavian language is spoken. A Presbyterian Church and school was founded in 1875. Westminster College had been added to its schools, and a new and very fine church is nearing completion. The Congregationalists have a great school and beautiful church. The Unitarians, the Central Christian Church, the Baptists and Christian Scientists each have places of worship. The Jews have a fine synagogue. The Josephites,—those who believe that Joseph Smith was a prophet but not a polygamist, have a representation in the city.

Theatres.—There are two theatres in Salt Lake, one built by the people several years ago, prior to the coming of the railroad. A Home Dramatic Company was formed, instructors were sent for; there was plenty of native talent, the theatre was a success, the Home Dramatic Company still flourishes. One result has been that Salt Lake has more first-class musical talent than any other city of its size in America. The Tabernacle Choir of 500 voices has a national reputation. The organist in the Tabernacle, the leader of the orchestra in the theatre, are both native Utahans. At the great jubilee celebration in 1897 there were 18 native martial bands in the procession.

Climate.—No better climate can be found than in Salt Lake. In winter the thermometer seldom descends lower than 12 degrees above zero; it seldom reaches 100 degrees above in summer,—it has more clear days than any other city and with the lake, the mountains, the springs and the delicious air, it is a natural sanitarium.

History.—The history of Salt Lake has no counterpart. The first band of immigrants were desperately poor. The soil they located on would produce nothing except through irrigation; they were 1,000 miles from any settlement east or west; they came as refugees; they were met by desolation; still at their coming they knelt upon the parched soil and held a praise service. Their first crop was almost a failure, their second was nearly all destroyed by locusts; that they lived through their trials must have been because they had grown superior to distress. But they did live and multiplied. They had disciplined themselves to be content with life's barest necessities; they had few comforts, luxuries they did not even dream of. They had been tossed naked upon the frontier, "a flaming sword that turned every way" was behind them. Since then there has been much clashing, once the government sent an army against them, but the city has grown and has become a great trade centre; it is the spot from which the Church of Jesus Christ of Latter Day Saints in every land receives direction; it is a beautiful city in itself; its surroundings are altogether august.

Population.—(1880) 20,768; (1890) 44,843; (1900) 53,531; (1910) 92,777.

C. C. GOODWIN,

Formerly Editor 'Salt Lake Tribune.'

Salt Lick, a place where salt is found on the surface of the earth, to which wild animals resort to lick it up; sometimes near salt springs.

SALT RANGE—SALTONSTALL

Salt Range, or **Kalabagh**, India, a mountain system in the Punjab, beginning on the south side of the Jhelum, and extending west to the Indus, reaching an elevation of from 3,200 to 5,000 feet. It consists of two chains running from east to west, which join in a high plateau; the general relief is bleak and dreary, while wildly picturesque. The mountains derive their name from the precipitous hills of solid rock-salt which occur on the border of the plateau. The salt stands out in huge cliffs at Mári, and the town of Kálábágh is built in an almost perpendicular hill of solid salt, in successive tiers,—the roof of each tier forming the street for the tier above. About 60,000 tons of salt are quarried annually, four fifths from the Mayo mines, near Pind Dadan Khan. Coal and other minerals also are found.

Salt River, (1) in Kentucky, has its rise in Boyle County, in the central part of the State; from whence it flows north, then west, then north by west to the northern boundary of the State, where it enters the Ohio at Westpoint, about 20 miles southwest of Louisville. It is about 100 miles long; and the chief tributaries are Rolling Fork and Beech rivers. (2) A river in Missouri, which has its source in Schuyler County, in the northeastern part of the State, flows south by southeast to Monroe County, turns east, then northeast and southeast, and enters the Mississippi near the town of Louisiana, in Pike County. It is about 200 miles long.

Salta, sál'tá, or **San Miguel de Salta**, Argentina, (1) capital of a province of the same name, in the elevated and well-watered Valley of Lerma (1,202 metres), about 800 miles northwest of Buenos Ayres. It is a bishop's see, and has a cathedral. Other important features are: the main square or Plaza on which stand the Cabildo, or capitol; the *Colegio Nacional*; a branch of the National Bank; an orphan asylum, hospital and the above-mentioned cathedral. There is a brisk trade, especially transit trade with Bolivia. It is connected by rail with Buenos Ayres and Jujuy. The town is neat but unhealthy. Pop. about 19,000.

(2) The Province of Salta is situated in the northern part of Argentina, and covers an area of 45,000 square miles. Its frontier borders on Bolivian territory. At the west it is mountainous. The highest summits reach an elevation of 6,000 metres, the plateaus 1,300 to 4,000 metres, and some of the passes 3,600 metres. The Sierra Lumbre and the Sierra de Sanita Maria border on the Andes. The mountains contain rich mineral deposits of gold, silver, copper, nickel, iron and lead. The waterways are numerous: The Vermejo and its tributaries, Rio San Francisco and Rio Balle, and Rio Passage (del Juramento), which joins the Paraná as Rio Salado. The climate depends upon the altitude, and different crops are planted accordingly. The products are sugar, corn, wine, and European fruits; barley, potatoes, and fodder-crops. The lower slopes and valley contains the pampas; the high summits and plateaus are treeless. The inhabitants are for the most part a mixed race of Spaniards and Calchaqui Indians.

Salter, sál'tér, **William Mackintire**, American author: b. Burlington, Iowa, 30 Jan. 1853. He was graduated from Knox College in 1871; studied for the ministry at Harvard and at Yale, and later pursued courses in political and social science at Göttingen, and at Columbia University. Since 1883 he has been a lecturer for the Societies for Ethical Culture in Chicago and in Philadelphia. He is the author of: 'Die Religion der Moral' (Leipsic 1885); 'Ethical Religion' (1889); 'First Steps in Philosophy' (1892); 'Anarchy or Government? An Enquiry in Fundamental Politics' (1895).

Saltillo, sál-tél'yō, Mexico, capital of the State of Coahuila; situated on the Tigre river, 65 miles southwest of Monterey, near the border line between that State and its neighbor on the north, the state of Nuevo Leon, elevation 5249 feet above sea level. It was given the rank of city in 1827 and named Leon-a Vicario, or Saltillo, by which latter name it is universally known. It was noted for many years for the superiority of the serapes made by the Indians of the vicinity,—a distinction, however, which has hardly been maintained in recent years. The battle field of Buena Vista, the scene of the defeat of the forces of Santa Ana, by General Taylor, in 1847, is but five miles distant, and near this are the baths of San Lorenzo. In the immediate vicinity are successfully grown all the fruits of the temperate zone and many which pertain to the tropics. The principal buildings are the Civil Hospital, the Penitentiary and the Acuña-a Theatre, and the chief manufacturing establishments are cotton mills, flouring mills and soap and cotton seed oil manufactories. The city enjoys a favorable reputation as a health resort. The three principal educational institutions,—the Juan Antonio de la Fuente School, the College of San Juan Nepomenceno, and the Normal School maintain creditable museums and there are four public libraries,—the State Library and those connected with the three Schools above named, which altogether contain over 6,000 volumes. The Bank of Coahuila, with a capital of \$1,600,000, and agencies of the National Bank, the Bank of London and Mexico and the Bank of Nuevo Leon provide the financial resources of the community.

Salto, Uruguay, the capital of the department of the same name on the northwest frontier opposite Concordia, Argentina, and at the head of navigation for large vessels on the Uruguay River. It is the shipping port of the surrounding region, a rich stock-raising district, and is 250 miles northwest of Montevideo, the capital of the republic, with which it is connected by rail. Pop. of town 10,000; of department about 42,000.

Saltonstall, sál'ton-stál, **Gurdon**, American colonial governor: b. Haverhill, Mass., 27 March 1666; d. New London, Conn., 20 Sept. 1724. He was graduated at Harvard in 1684, and became minister of the church of New London, Conn., in 1691. He succeeded Governor Winthrop as chief executive of Connecticut in 1708, and continued in office until his death. Through his efforts the first print-

SALTPETRE — SALTS

ing press was established in the colony. He was also active in the founding of Yale and in its establishment at New Haven.

Saltpetre. See NITRATE OF SODA.

Saltpetre, Chile. See NITRATE OF SODA.

Salts, a very important class of substances in chemistry. The word salt was first used to designate the solid residue obtained by evaporation of sea water, and as sodium chloride is its chief constituent the term *salt* got to mean popularly that substance alone.

Many other substances besides common salt are known by the general name *salts* because of their similarity to common salt in general physical properties, such as solubility in water, taste, having crystalline form, etc. Some of the most common are saltpetre, smelling salts, etc. See below.

The chemical meaning of the term salt is quite another thing. While the substances mentioned above are indeed salts in the chemical sense, many other substances, as oil of wintergreen, for example, that have none of the physical characteristics of common salt must also be included under this term. To the chemist, a salt is a chemical compound that may be considered as derived from an acid by the replacement of part or the whole of the hydrogen of the acid by a metal or a "radical" playing the part of a metal. For example, the salt sodium nitrate, NaNO_3 , is derived from the acid HNO_3 , by the replacement of the hydrogen by the metallic element sodium, Na; also ammonium chloride NH_4Cl is derived from the hydrochloric acid HCl by similar replacement of hydrogen by the radical NH_4 . The most general chemical conception of the composition of salts is that which formulates them as M_xN_y , where M is the basic or positive portion and N the acid or negative part of the salt. Either M or N may be either elementary atoms or groups of different atoms acting as single atoms (radicals). Examples AgCl , $\text{Ag}(\text{NO}_3)$, NH_4Cl , $(\text{NH}_4)_2\text{SO}_4$.

Salts are formed in many ways; one of the most important being by the action of an acid on a base by which water and a salt are formed, the salt differing in properties from both the acid and base used. Thus hydrochloric acid and potassium hydroxide mutually react, the products being potassium chloride and water. $\text{HCl} + \text{KOH} = \text{KCl} + \text{H}_2\text{O}$. Salts are frequently formed by the action of an acid on a metal. Zinc and sulphuric acid forming the salt zinc sulphate and hydrogen $\text{Zn} + \text{H}_2\text{SO}_4 = \text{ZnSO}_4 + \text{H}_2$. A very common method for the formation of salts is by the process called double decomposition, whereby two new salts are formed when solutions of two salts are brought together. When a solution of barium chloride is added to a solution of sodium sulphate a white solid separates which is a new salt barium sulphate, while in the solution is another new salt, sodium chloride. $\text{BaCl}_2 + \text{Na}_2\text{SO}_4 = \text{BaSO}_4 + 2\text{NaCl}$.

Salts are often classified as normal, acid, basic, and double. An acid having more than one hydrogen atom replaceable by basic atoms or groups may form both acid and normal salts according to whether a part or whole of that hydrogen is replaced. Sulphuric acid H_2SO_4

can form acid salt KHSO_4 , and the normal salt K_2SO_4 . An acid having three replaceable hydrogen atoms can form three varieties of salts. Phosphoric acid H_3PO_4 , for example, can give two acid salts KH_2PO_4 , K_2HPO_4 , and a normal salt K_3PO_4 . A basic salt is one derived from a base having more than one hydroxyl (OH) group and in which all of the hydroxyl groups have not been replaced by acid groups. Basic bismuth nitrate $\text{Bi}(\text{OH})_3\text{NO}_3$ is derived from bismuth hydroxide $\text{Bi}(\text{OH})_3$, by replacement of only one (OH) by the acid group NO_3 . An acid salt still contains acid hydrogen and will unite with more base to form a normal salt. A basic salt still contains basic hydroxyl (OH) and will unite with more acid to form a normal salt. A normal salt contains neither acid hydrogen nor basic hydroxyl. The term double salt has been applied to two different classes of compounds, the dividing line between which is, however, often very faint. Acids having more than one replaceable hydrogen atom may form normal salts in which two or more different basic atoms or groups are combined with the acid group, as magnesium ammonium phosphate, $\text{Mg}(\text{NH}_4)\text{PO}_4$, or potassium sodium tartrate $\text{KNa}(\text{C}_4\text{H}_4\text{O}_6)$. Another class of double salts is formed by the union of two or more molecules of certain normal salts $\text{K}_2\text{SO}_4 : \text{Al}_2(\text{SO}_4)_3$, $\text{PbI}_2 : 2\text{KI}$, etc.

Method of Naming Salts.—Part of the name is derived from the basic element or group present; thus those containing sodium are called sodium nitrate, nitrate of sodium, or often nitrate of soda, chloride of soda, etc. The other portion is derived from the acid element or group present. Thus salts derived from nitric acid are called nitrates; from hydrochloric acid, chlorides; from sulphurous acid, sulphites; from perchloric acid, perchlorates. It will be noticed that all but the last syllable is the same as the name of the acid and also that this last syllable differs according to the last syllable of the name of the acid. An acid whose name ends in *ic* forms a salt whose name ends in *ate* (see exceptions below). One ending in *ous* forms an *ite* salt. A salt in which the acid part is a single element has the termination *ide*, even though the acid name ends in *ic*. Thus sulphuric acid forms sodium sulphate; sulphurous acid, sodium sulphite; hypophosphorous acid, sodium hypophosphite; hydrochloric acid, sodium chloride. Sometimes a metal forms two salts with the same acid in which the number of acid groups united with one atom of the metal varies. Thus iron (ferum) unites with nitric acid forming two salts, $\text{Fe}(\text{NO}_3)_2$ and $\text{Fe}(\text{NO}_3)_3$. The first one containing the smaller number of acid groups is called ferrous nitrate while the other is ferric nitrate.

The naming of acid salts has called into use a few other terms. The acid sodium salt of sulphuric acid HNaSO_4 is called acid sodium sulphate or hydrogen-sodium-sulphate. With an acid like phosphoric, H_3PO_4 , having three acid hydrogens we have H_2NaPO_4 , di-hydrogen-sodium-phosphate or primary sodium phosphate, HNa_2PO_4 , hydrogen-di-sodium-phosphate or secondary sodium phosphate. The normal salt Na_3PO_4 is also called tertiary sodium phosphate.

SALTUS—SALUTATION

As has been said the term salt, salts, sal, are often applied to various substances of household or medicinal use. A few of the most common are given below with list of their correct chemical names. Sal soda, sodium carbonate; Epsom salts, magnesium sulphate; Rochelle salts, sodium potassium tartrate; saltpetre, potassium nitrate; sal ammoniac, ammonium chloride; salts of tartar, potassium carbonate; Glauber salts, sodium sulphate.

Saltus, sâl'tûs, Edgar Everston, American novelist: b. New York 8 June 1858. He was educated at the Sorbonne in Paris, Heidelberg and Munich, and was graduated from Columbia Law School in 1880. His first book was 'Balzac: a Study' (1884), which he followed by 'The Philosophy of Disenchantment' (1885), and 'The Anatomy of Negation' (1886), two works attempting a popular exposition of the theories of Schopenhauer and von Hartmann. Among his novels are: 'Mr. Incoul's Misadventure' (1887); 'The Truth About Tristrem Varick' (1888); 'Eden' (1888); 'A Transaction in Hearts' (1889); 'The Pace that Kills' (1889); 'Enthralled' (1894); 'When Dreams Come True' (1895); 'The Yellow Fay' (1905).

Saltville, Engagement at. The extensive salt works at this place, in southwestern Virginia, furnished that State, the adjacent States of the South, and the Confederate armies their supply of salt. Not until the third year of the war did the Union forces make any serious efforts to destroy these works. On 2 May 1864 Gen. Crook started from Charlestown, on the Kanawha, to join Gen. Sigel in the Shenandoah Valley, and one column of 2,600 cavalry, under Gen. Averell, was directed upon Saltville to destroy the works, and was afterward to rejoin the main column under Crook. After a very difficult march through the mountains Averell reached Tazewell Court House where he learned that Saltville was well defended by earthworks and artillery, and was held in strength by Gen. W. E. Jones, whereupon he abandoned the idea of an attack, and, after a severe engagement at Wytheville on the 10th, joined Crook at Union on the 15th.

Late in September 1864 Gen. S. G. Burbridge with a mounted force of about 5,000 men, advanced through eastern Kentucky to Prestonsburg and up the Louisa Fork of the Big Sandy on Saltville. He was met 23 miles from Saltville by a small brigade of Confederate cavalry, which delayed him two days, thus enabling Gen. Breckinridge to gather about 3,500 men at Saltville, so that when Burbridge appeared before the place, 2 October, he found the salt-works well defended, with Breckinridge in command. He made an immediate attack and was stubbornly resisted, but after a hard struggle he gained the right and centre of the Confederate works. The Confederate left resisted all his efforts, and at 5 P.M. Burbridge withdrew from the contest, and abandoning his dead and wounded, marched all night toward Prestonsburg, thence continuing his retreat. The Union loss was 54 killed, 190 wounded, and 104 captured. The Confederate loss was much less.

On 12 Dec. 1864 Gen. Stoneman with 5,700 men, started from Bean's Station, Tenn., on a raid into southwestern Virginia. He attacked Saltville and carried it on the 20th, burned the

town, and destroyed the salt-works. (See STONEMAN'S RAID.) Consult: 'Official Records,' Vols. XXXVII., XXXIX., XLV.; Pond, 'The Shenandoah Valley'; Van Horne, 'History of the Army of the Cumberland', Vol. II.; The Century Company's, 'Battles and Leaders of the Civil War,' Vol. IV.

E. A. CARMAN.

Saltzmann, zälts'män, Karl, German painter: b. Berlin 23 Sept. 1847. He was a pupil of Goldschmidt and of the marine painter Hermann Eschke. He made a trip round the world in the train of Prince Henry of Prussia and later became professor in the Academy at Berlin. His principal works are: 'Dawn by the Sea' (1874); 'Entrance into Harbor of Colberg'; 'Harbor of Valparaiso' (1882); and 'Saved' (1884).

Salus, sâl'lûs, in Roman mythology, the goddess of health, prosperity and public welfare.

Saluta'tion, any mode of greeting or of kindly or respectful or reverential address, by word or gesture when persons meet, whether equals with equals or inferiors with superiors. The lowest class of salutations, which merely aim at giving agreeable bodily sensations, are compared by Tylor ('Early History of Mankind,' ch. iii.), to the tokens of kindness exchanged among the lower animals: such are patting, stroking, kissing, pressing noses, blowing, sniffing, etc. Among American Indians one mode of greeting consists in rubbing each other's arms, breast or abdomen and their own: to the same class belong the patings and slappings of the Fuegians. The Andaman Islanders salute by blowing into another's hand with a cooing murmur; Charlevoix tells of an Indian tribe on the Mexican Gulf who blew into one another's ears, and a similar usage was found existing in Equatorial Africa by Du Chaillu. The kiss is by no means, what it has been by some authors reputed to be, a universal and instinctive act of salutation: it is unknown over half the world, and there the prevailing usage is that of smelling or sniffing, called "rubbing noses"; Darwin finds this custom existing among the New Zealanders and Linnaeus among the inhabitants of the Lapland Alps; but it is the custom of Polynesians, Malays, the populations of Indo-China and the Eskimo. In ancient Greece it was customary to kiss the hand, breast or knee of a superior; in ancient Rome the kiss was a token of civility and was a customary mode of salutation among kinsmen and close friends. In the early Christian Church the kiss was a sign of fellowship, and Saint Paul in four places of his epistles and Saint Peter in one make such mention of the "holy kiss" as proves it to have been customary in the assemblies of the faithful. In the Roman Catholic Church the "kiss of peace" is to this day exchanged among the clergy after the consecration of the elements in the solemn high mass; but it is not practised by the laity in the nave of the church. The kissing of the feet was from very early times a customary mode of doing homage; it still continues in a modified form in the papal court, where the person who comes into the presence of the Pontiff kisses the golden cross upon his sandal. The custom of kissing among men

SALUTES—SALUTES WITH CANNON

appears to have persisted in England till the middle of the 17th century; it still exists in the countries of continental Europe. In those countries the servant kisses the hand of master or mistress; and there remains a trace of this custom in the Spanish language, in the formula used at the close of a letter, equivalent to "your obedient servant," *beso a Vmd. las manes*, "I kiss your worship's hands." The embrace is almost universal: it is used by the rude Andaman Islanders, the Blackmen of Australia, the Fuegians, as it was used by the Patriarch Jacob, or by Philæus and Eumæus when, on recognizing Ulysses (*Odyssey*, Dryden, xxi.),

Around his neck their longing arms they cast,
His head, his shoulders, and his knees embraced;

or as it is still used among highly cultured people. The attitude of cowering or crouching in presence of a superior is seen represented in all the sculptures of ancient Egypt and Assyria; and in barbarous countries it still persists, as in Dahomey or in Siam; little different is the self-abasement of a Siberian peasant in presence of a noble. Bowing in sign of reverence may range all the way from Jacob's bowing himself to the ground seven times to do honor to Esau, and the gesture little more than a nod practised in modern society. Clasp hands was among the ancient Romans, as among us, customary among acquaintances; it is a custom not very widely diffused, but in late years it has been introduced among rude peoples, such as Australians, Hottentots and Fuegians through their contact with European traders and missionaries. The familiar words of greeting differ but little among modern civilized peoples. Our "Good morning" and "How do you do?" have their equivalents in the other European languages. But in German countries wherever the population is chiefly Catholic a current form of salutation, especially among peasants, is *Gelobt sei Jesus Christus*, and the response, *in Ewigkeit. Amen* (Praised be Jesus Christ for evermore. Amen). In Ireland it is, or used to be, a custom among simple folk for one on entering a house to pronounce the benison "God save all here," and the response would be "God save you kindly, sir (or ma'am)." The biblical "Peace to thee and to thine house" is still in use among the Moslem: *Salam 'alaikum. Wa- 'alaikum as-salam* (Peace be on you. And on you be the peace). The salutation of the ancient Greeks both at meeting and parting was χαῖρε (be joyful); the Romans used two words, both signifying "be in health" or "be well"; on meeting their word was *Salve*, at parting *Vale*. The English phrase Good-by is the remnant of the ancient pious formula, God be wi'ye, and answers to the French Adieu, Spanish A'Dios, Italian Addio, etc.

Salutes, Military, an essential form of discipline regulated and enforced by military law. All officers salute on meeting and on making or receiving official reports. Military courtesy requires the junior to salute first or when the salute is introductory to a report made at a military ceremony or formation to the representative of a common superior, as for example to the adjutant or officer of the day, the officer making the report, whatever his rank may be, is required to salute first; the officer to whom the report is made will acknowledge by saluting

that he has received and understood it. When under arms the salute is made with the sword or saber if drawn, otherwise with the hand, and a mounted officer always dismounts before addressing a superior who is not mounted. On official occasions officers, when indoors and under arms, do not uncover, but salute with the sword, if drawn, and otherwise with the hand. If not under arms they uncover and stand at attention, but do not salute except when making or receiving a report.

When an enlisted man without arms passes an officer he salutes with the hand farthest from the officer, but if mounted he salutes with the right hand, and officers are to be saluted whether in uniform or not. When armed with the saber and out of ranks an enlisted man salutes with the saber, if drawn, but otherwise with the hand. If on foot and armed with a rifle or carbine he salutes with his weapon. A mounted soldier dismounts before addressing an officer not mounted. An enlisted man, if seated, rises on the approach of an officer, faces him and salutes; if standing he faces the officer for the same purpose. If both remain in the same place or on the same ground such compliments need not be repeated, and soldiers, if at work, do not cease work to salute an officer unless addressed by him. Before addressing an officer an enlisted man salutes as prescribed, and he also makes the same salute after receiving a reply. Indoors and unarmed an enlisted man uncovers and stands at attention on the approach of an officer. He does not salute unless he addresses or is addressed by the officer. If armed he salutes as though outdoors.

When an officer enters a room where there are soldiers the word "attention" is given by someone who perceives him, when all rise and remain standing in the position of soldier till the officer leaves the room; but soldiers at meals do not rise. Officers are required to at all times acknowledge the courtesies of enlisted men by returning salutes given, and when several officers in company are saluted, all who are entitled to the salute return it.

Salutes with Cannon. The salute to the Union—one gun for each State—is fired at noon of the Fourth of July at every military post and on board commissioned naval vessels belonging to the United States. The National Salute of 21 guns is the salute for the National flag, the President of the United States, presidents of foreign republics or sovereigns of foreign states visiting the United States. The Vice-President of the United States, and American and foreign ambassadors are saluted with 19 guns; the president of the Senate, speaker of the House of Representatives, members of the cabinet, the chief justice, a congressional committee, governors within their respective States or Territories, viceroy or governor-general of provinces belonging to foreign States, general of the army, admiral of the navy, and same ranks in foreign armies and navies, 17 guns; American or foreign envoys, or ministers plenipotentiary, assistant secretaries of the navy or war, lieutenant-general, or a major-general commanding the army, and corresponding ranks in the navy and foreign armies and navies, 15 guns; ministers-resident accredited to the United States, major-general, rear-admiral, and corresponding ranks of foreign armies and navies,

SALVADOR

13 guns, and *chargés d'affaires*, brigadier-general, commodore, and corresponding ranks in foreign armies and navies, 11 guns. Consuls-general accredited to the United States receive a salute of 9 guns.

Salutes are only fired between sunrise and sunset, and not on Sundays, except in international courtesies. The national colors are always displayed at the time of saluting. The salute to the flag is the only salute which is returned, and this must be done within 24 hours. United States vessels do not return the salute to the flag in United States waters if there is any fort or battery there to do it. Nor do United States vessels salute United States forts or posts.

If there are several batteries or forts within sight or 6 miles of each other, one of them is designated as the saluting fort, and returns all salutes of foreign men-of-war. In New York, Castle William, on Governor's Island, is the saluting fort.

Salvador, *säl-vä-dör'*, the smallest and most densely populated of the Central American republics, bounded on the north and northeast by Honduras, on the southeast by the Gulf of Fonseca, on the south by the Pacific Ocean, and on the west by Guatemala. Its area is usually given as 7,225 to 7,255 square miles; but an official publication, dated 1902, containing results of the census taken by the government on 1 March 1901, represents that the total area (the sum of the areas of the 14 departments) is 34,126 square kilometres, with an average population of 29.5 persons to the square kilometre. (See below: *Population*.)

Political Divisions.—The departments are: Santa Ana, Ahuachapán, Sonsonate, La Libertad, San Salvador, Chalatenango, Cuscatlán, La Paz, San Vicente, Cabañas, Usulután, San Miguel, Morazán, and La Unión. The largest cities are: the capital, San Salvador, population 59,544; Santa Ana, 48,120; San Miguel, 24,768; Nueva San Salvador, 18,768; San Vicente, 17,892; Sonsonate, 17,016; Zacatecoluca, 15,130; Ahuachapán, 14,136; and Sansuntepeque, 12,456. The capital is situated in the valley of Las Hamacas, on the Acelhuate River, 2,115 feet above sea-level. Frequent disasters have taught the inhabitants the art of building earthquake-proof structures. The streets are well lighted, and nearly all are paved. In addition to the offices of the government departments and of the courts, the city has an academy of science and belles-lettres, national library, astronomical observatory, museum, botanical garden, chamber of commerce, several parks and public squares, a good water-supply, four banks of issue, etc.

Physical Geography.—On the northern frontier rises the great mountain chain, the Sierra Madre or Cordillera, with peaks 7,000 to 8,000 feet high, in which primitive rocks predominate. About 15 miles from the coast, and running parallel with it, is a range composed of plutonic material. Both systems include transverse ridges; the latter, the Coast Range, is intersected by the valleys of the Lempa and Grande rivers, and in or near it are situated the volcanoes San Vicente (7,683 feet), San Salvador, Santa Ana, San Miguel, Usulután, Apaneca, Izalco, Sociedad, and Chinameca (4,200 feet), most of which are extinct. Earthquakes are of

frequent occurrence: the capital has been wrecked by them 11 times since 1539, and is, in fact, "so subject to rockings and tremblings of the earth as to have acquired the name of the swinging hammock." The best natural harbor is that of La Unión, but it is not yet connected with the inland towns by rail. Acajutla and La Libertad are open roadsteads.

Mineral Resources, Soil and Climate.—In a recent report devoted to mining operations, the consul-general of the United States writes from San Salvador: "For this republic a report can only be made on the production of gold and silver. While a number of promising copper fields are known, almost nothing has been done as yet in their development. . . .

Owing to a general reticence on the part of local mine owners, it is impossible to state what each mine is producing. . . . The exportation of precious metals during 1900 was only \$77,945, while in 1901 the amount produced and exported reached the total of \$192,735.23. Of this very little is silver, as the ores of the mines now being worked carry only a small percentage of this metal." The soils on the slopes of mountains, table-lands, and in the valleys, formed by the detritus of the rocks and decomposed vegetable matter, are remarkably fertile. The year is divided into two seasons—the rainy months being those from May to October, the dry from November to April. Low coast lands are hot and unhealthful; a comparatively cool and agreeable climate is found in the highlands of the interior.

Agriculture and Commerce.—Nearly all parts of the republic are well adapted to agriculture, which is, therefore, the principal occupation of the inhabitants. Products are: coffee, indigo, rubber, cacao, balsam, tobacco, and a variety of grains, seeds, and fruits. In regard to coffee, the following statistics were prepared by the government: Area planted in coffee trees, 50,000 hectares (hectare = 2.471 acres); virgin lands suitable for growing this crop, about 20,000 hectares; average bearing life of a coffee tree in Salvador, 30 years, and average production 350 grams. The shipments of coffee from the republic to foreign countries in 1900 were: To Australia, 1,343,251 pounds; Belgium, 210,834 pounds; Chile, 1,830 pounds; Colombia, 2,290 pounds; England, 5,329,398 pounds; France, 23,815,148 pounds; Germany, 7,420,280 pounds; Italy, 4,462,905 pounds; Spain, 38,344 pounds; United States, 7,477,476 pounds; total 50,101,756 pounds. The value of the coffee exported in that year was given as 7,568,339 silver dollars; other exported articles, with their values in silver dollars, being: Indigo, 638,700; balsam, 295,439; tobacco, 111,127; sugar, 96,981. In 1901 exports were valued at 10,956,045 silver dollars, and imports (subject to duty) 6,537,876 silver dollars. See also **EXPORTS AND IMPORTS OF LATIN-AMERICA**.

Shipping, Railways, etc.—In 1901 vessels to the number of 515, carrying 204,157 packages of merchandise and 2,686 passengers, entered the ports of Acajutla, La Libertad, and La Unión. From the same ports cleared 514 vessels, carrying 424,304 packages of merchandise and 2,567 passengers. In order to stimulate maritime commerce, subventions were given (1902) to the Pacific Mail S.S. Co., the Pacific Steam Navigation Co., and the South American S.S. Co.

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(Compare message of the President, 12 Feb. 1903.) There were in operation in the republic 132 telegraph and 62 public telephone offices. The post-offices handled 1,623,561 pieces of domestic mail matter, and the international service consisted of 494,900 pieces, in 1901.

Weights, Measures, and Money.—Fanega (dry) = 1.5745 bushels; *centaro* (liquid) = 4.2631 gallons; *libra* = 1.043 pounds; *vara* = 33.874 inches. The decimal system, though made obligatory by law, 1 Jan. 1886, has not been universally adopted. The monetary unit is the silver *peso*. On 1 Jan. 1904 it was stated that the "dollar" (silver *peso*) of Salvador was worth \$0.424 in U. S. currency. A bill on monetary reform, passed 30 Sept. 1892, provided: "Gold shall be the standard," but the government has been only partially successful in its endeavors to carry out this radical change.

Government.—By the constitution, "legislative power is vested in a body called the National Assembly of Deputies," which meets in February, each year. Deputies, three from each department, are elected by the people. "Executive power is vested in a citizen who shall have the title of President of the Republic"; his term is four years; he cannot be re-elected until after the expiration of a second period of equal duration. The vice-president is also chosen for four years. Secretaries of state or ministers are appointed by the president, the portfolios being: Foreign Affairs, Justice, and Religion; Treasury, Public Credit, War, and Marine; Interior and Government; Public Works, Instruction, and Charities. "Judicial power is vested in a Supreme Court of Justice, in Chambers of third and second instance," etc. Each of the 14 departments has its governor, whom the Executive appoints. Municipalities are governed by officers chosen by the people.

Finances.—The president's message of 12 Feb. 1903 shows the financial situation of the country in 1899-1902, inclusive,—amounts being stated in silver dollars:

REVENUE FROM CUSTOMS, LIQUOR TAXES, ETC.			
1899	1900	1901	1902
\$5,276,383.29	\$6,654,143.69	\$7,690,679.73	\$8,589,747.11
EXPENDITURES — LEGISLATIVE, EXECUTIVE, JUDICIAL, PUBLIC CREDIT, ETC.			
1899	1900	1901	1902
\$5,176,212.10	\$6,794,873.60	\$7,640,891.17	\$8,570,847.58
FOREIGN DEBT.			
1899			1902
\$9,062,500.00			\$9,062,500.00
INTERNAL DEBT.			
1899			1902
\$11,002,718.41			\$9,676,628.52

Duties are levied on both imports and exports. In 1901, for the coffee exported the duties paid amounted to \$529,917.64 silver.

Army and Navy.—The constitution, Articles 134 and 135, provides: "In case of war, all able-bodied Salvadorians from 18 to 50 years of age are soldiers. The strength of the standing army in time of peace shall be fixed every year by the legislature, and shall be limited to what is strictly necessary to protect the ports," etc. In practice, about 4,000 regulars are maintained, and the militia numbers about 25,000. The navy has one vessel, which is employed to enforce revenue laws.

Population, Education and Religion.—The census of 1 March 1901 showed, as the total number of inhabitants, 1,006,848, of whom 772,200 were mestizos, ladinos, and whites, and 234,648 Indians of pure blood. Under the constitution (Art. 33), "teaching is free. Primary instruction is compulsory. The instruction given in the establishments supported by the state shall be laical and gratuitous." About 31,000 students and pupils are enrolled at the institutions of learning of various grades: the university, the normal and high schools, and the 585 primary schools. Article 12 of the constitution provides: "The free exercise of all religions . . . is guaranteed. No religious act shall serve to establish the civil status of a person." Pop., 1910, about 1,700,000.

History.—In the summer of 1524 Pedro de Alvarado invaded the territory now called Salvador, coming from Mexico by way of Guatemala. The Indian capital, Cuscatlan, was captured the following year. On 4 April 1528 the city of San Salvador was founded, but it became necessary to abandon the site originally chosen in favor of the present one, and the transfer was made in 1539. As a subordinate part of the viceroyalty of Guatemala, Salvador continued to be a Spanish possession until 1821 (see EMANCIPATION IN LATIN-AMERICA for declaration of independence, etc.). Between 15 Sept. 1821, when Guatemala severed her connection with Spain, and 1824, when the Central American confederation was formed (see CENTRAL AMERICA), Salvador was compelled to assent to the annexation of her territory by Mexico. After the federation had dissolved (1839), Morazán tried to reunite the five small states of which it had been composed: in September 1842 he was made prisoner and shot at San José, Costa Rica. In 1885 the president of Guatemala, Gen. Justo Rufino Barrios, made an effort to restore the old relations between the states in the northwestern part of Central America. He also failed. On 13 Aug. 1886 Salvador promulgated the constitution which is now in force. The most important single fact in the history of the little republic, as in that of Guatemala (q.v.), is the survival of the Indian element in undiminished force. Educated Salvadorians of the present day, when writing of the sufferings of the natives during the period of Spanish supremacy, unconsciously refer to the wrongs *sustained*, not *inflicted*, by their own ancestors. (It is desirable to add, in view of the diversity of usage, that the forms "Salvadorian" and "Ecuadorian" seem to be preferable to "Salvadoran" and "Ecuadoran.")

Consult the Handbook of Salvador, issued by the Bureau of American Republics; also Bulletins of that Bureau for 1902-1904; Bancroft, 'History of Central America'; Reyes, 'Notiones de Historia del Salvador'; Squier, 'The States of Central America.'

MARRION WILCOX,
Authority on Latin-America.

Salvage, the act of saving a ship or goods from extraordinary danger, as from fire, the sea, an enemy, pirates, or the like. In commercial and maritime law: (1) A payment or compensation to which those persons are entitled who have by their voluntary efforts saved ships or goods from extraordinary danger, as from fire, the sea, an enemy, pirates, or the like.

SALVARSAN

The amount of salvage to be paid is generally agreed on between the salvors and the owners of the property salvaged; but if they cannot agree, the sum to be paid, and the proportions in which it shall be paid, are determined by the Admiralty Court. The crew of a ship are not entitled to any salvage for any extraordinary efforts they may make in saving their own vessel. (2) The property saved from extraordinary danger by the voluntary efforts of the salvors. See ADMIRALTY LAW.

Salvarsan and Neosalvarsan. The term salvarsan is used commercially as the equivalent of dioxymethylene arsenobenzol, the formula for which is $C_{12}H_{12}O_2N_2As$. It is popularly known as 606 because its originators Ehrlich and Hata made that number of experiments and combinations before arriving at salvarsan. Its discovery was announced in the early part of 1911. It is also known as the Ehrlich-Hata preparation. The active element in this combination as indicated in the formula is arsenic. The aim and the hope of Ehrlich in his long series of patient efforts was to find a substance which in a single dose at a single blow should overpower syphilis (q.v.) a goal which he termed *therapia magna sterilisans*. A very ambitious project, almost an impossibility, and yet he barely missed it.

In the experimental work in which apes had been successfully syphilized with cultures of *Spirochaeta pallida*, contrary to the belief that animals could be inoculated with syphilis, Ehrlich's dream had been partially realized. Apes, including chimpanzees, had been sterilized, that is, they had been cured of experimental syphilis with a single dose of salvarsan but in human beings this cannot be done. Still salvarsan is one of the greatest of human achievements in the field of therapeutics.

Remarkable results, not cures, have been obtained and may still be obtained with a single dose of salvarsan, especially if the disease is treated in the very early stage, but to produce such a profound effect as is implied in the cure of syphilis would require a larger dose than could be tolerated by a human being, it would produce a poisonous and probably a fatal result.

Salvarsan is a yellow powder which is soluble in water and has an alkaline reaction. It must be dissolved in distilled, *not in boiled water* for it has been found, or at any rate supposed that the albumen from the organisms in the water which has been boiled for the solution would vitiate the action of salvarsan when introduced into the body. Unlike mercury it may not be taken by the mouth nor rubbed into the skin by means of an ointment. It is used entirely by injection, three methods being possible, the subcutaneous, the intramuscular, and the intravenous. The subcutaneous method has been practically abandoned for the substance remains within the tissues as an infiltrate, without producing any appreciable effect upon the spirochetes which are the cause of the disease. In fact it becomes a distinct source of harm, and cases have repeatedly been reported in which it has resulted in abscess and extensive necrosis of tissue.

Intramuscular injections have been approved by some physicians and discarded by others. The large muscles of the gluteal region are usually selected for this purpose and the injection into them is made deeply. The objections to this method are the intense and

persistent pains which follow the injections and the continuance for a prolonged period of the infiltrations. These infiltrations do not terminate in suppuration but the salvarsan may become disintegrated and cause arsenical poisoning.

The form of injection which now receives the approval of the majority of experienced syphilographers is the intravenous.

The veins at the bend of the elbow are selected for the injection, the skin being first carefully sterilized. A tourniquet is secured around the arm and the injection is made into either of the veins which are thereby distended. After the operation of injection has been accomplished the wounded vein must be carefully dressed, this precaution being an important one.

It is also very important that the injection should not be made as a matter of office routine, but in the patient's house, or in a hospital where all necessary appliances are at hand. The patient should remain in bed from 24 to 48 hours after he has received the injection. The reaction which may be expected from an intravenous injection of salvarsan usually consists of slight elevation of temperature, chill, fever, headache, and vomiting.

The quantity of salvarsan which should be used in an injection is from 0.4 to 0.6 gram. Death has been attributed to arsenical poisoning in some of the fatal cases, as large a quantity as three or more grains of arsenic having been liberated into the body by the disintegration of the injected salvarsan.

It is quite apparent that the danger which attends the intravenous method is much greater than that which attends the intramuscular. Contra indications to the use of salvarsan are heart disease in various forms, including aneurysm and dilatation, myocarditis, and uncompensated valvular disease. It should not be used in cases of advanced nephritis, nor in those cases of tertiary syphilis in which the cerebral and meningeal symptoms are threatening, in arterio-sclerosis nor in the presence of high fever. Blindness and deafness have occurred after the injection of salvarsan but they have usually cleared up after a suitable course of treatment with mercury. It is now believed that syphilis cannot be cured with salvarsan alone but that it should be used in conjunction with mercury, except possibly in primary syphilis.

Neosalvarsan.—The bad results which attended the use of salvarsan induced Ehrlich to continue his experiments in the hope of discovering a substance by which they might be obviated. In October 1911, he introduced Neosalvarsan or 914 (the number indicating the total in the series of his experiments, from the beginning) a condensation product of formaldehyde, sulphonylate of sodium and salvarsan. Its distinct advantage over salvarsan is that it is neutral in reaction, salvarsan being alkaline.

It is a dry powder which is readily soluble in water or preferably in a dilute solution of sodium chloride.

It is used by injection either intramuscularly or intravenously, and will not cause infiltrations like salvarsan, nor will it cause necrosis of the veins into which it is injected, nor will it produce the severe pain which is caused by salvarsan. Because of its neutral reaction it will modify or abolish certain bad symptoms which have frequently followed the use of salvarsan

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including vaso-motor disturbances and congestions which have sometimes resulted in collapse, œdema of the face, diarrhœa, colic, etc. Larger doses of this substance may be used than of salvarsan of which it contains 66 per cent. It is always safer, however, to begin the treatment with a small dose, especially in women, and increase them as the indications may warrant. Thus the limits of dosage may be placed between 0.3 and 1.5 gram. The contra-indications are the same as for salvarsan.

Under the use of this substance, especially when combined with mercury, the symptoms of syphilis rapidly improve, and the Wassermann test, which should be repeated every month or two, will indicate the progressive destruction and disappearance of the spirochetes.

There is no definite time limit within which salvarsan or neosalvarsan, in connection with mercury, should be used; it may be a year; it may be much longer. A persistent negative Wassermann reaction indicates the disappearance of the cause of the disease, but just when this limit will be reached it will be impossible to predict in any given case. The use of salvarsan and neosalvarsan has also been extended to the treatment of relapsing fever, scarlet fever, malaria, and various nervous diseases including cholera.

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Salvatierra, sāl-vā-tē-ēr-rā, Mexico, city in the State of Guanajuato, on the Rio Lerma, and the Celayo-Acambaro R.R.'s, 50 miles southwest of Queretaro. The chief industry is cotton-spinning. Pop. 14,322.

Salvation Army, The. The story of the Salvation Army is the story of an aggressive religious organization that has won its way around the world entirely on its own merits, and has built itself up from what had hitherto been regarded as most unpromising material. The Army is organized on military principles, with a view to reaching the non-churchgoing masses of the world. It was first started in July 1865, in the East End of London as the Christian Mission. Thirteen years later, at Christmas 1878, it received the name of The Salvation Army. Since then its growth throughout the world has been phenomenal. General William Booth (q.v.), its well-known father and founder, was born in Nottingham, England, on 10 April 1829; d. London 20 Aug. 1912. In 1852 he entered the ministry of the Methodist Church and became a powerful evangelist, attracting immense crowds and witnessing thousands of conversions. Finding, however, that the churchless masses could not be reached by ordinary methods, he resigned his pastorate and established the Christian Mission which afterward developed into The Army. In this he was ably assisted by his wife, Catherine Booth, who was familiarly known as the Mother of the Salvation Army. She was born in 1829 and died on 4 Oct. 1890. She was regarded by many as the most eloquent and powerful woman speaker of the century, and did more than any other to open up the way for women to preach the Gospel. The absolute equality of women as leaders, officeholders and preachers became one of the cardinal planks in The Army platform. As a temperance movement the value of the work of The Army cannot be over-estimated.

It has been said that The Salvation Army has been the means of converting hundreds of thousands of confirmed drunkards. As total abstinence is a condition of membership, this can be readily understood.

The international headquarters of The Army are in London. Its world-wide operations are carried on in 49 countries and colonies, embracing 7,585 posts, under the charge of 16,020 officers and employees, with 45,000 local officers, 16,000 brass bandmen and about 50,000 musicians. Fifty-eight periodicals are published in 24 languages, with a weekly circulation of about 1,050,000. There are 668 social relief institutions in the world, under the charge of nearly 3,000 officers and employees. About 7,000 fallen women annually pass through the 113 rescue homes, and from 80 to 90 per cent of these are permanently restored to lives of virtue. About 1,500 ex-convicts pass annually through the prison gate homes. There are 132 slum settlements in the poorest districts of great cities, the worst dives, saloons and tenements being regularly visited. The number of annual conversions in connection with the spiritual work have averaged from 200,000 to 250,000 during the past ten years, making a total of over 2,000,000, of whom not less than 200,000 were converted from lives of drunkenness.

The headquarters of The Salvation Army in America are in New York. Commander Booth Tucker is in charge of the work. The first party of officers, under Commissioner George Railton, landed in New York in February 1881. The work has made rapid progress, especially during the last few years, for which the figures stand as follows:

Institutions, etc.	1896	1903	Increase
Officers and employees.....	2,000	3,171	1,171
Corps and institutions.....	620	900	280
Institutions for the poor.....	30	209	179
Accommodation in same.....	600	9,560	8,960
Expended annually in poor relief.....	\$20,000	\$800,000	\$780,000
Persons provided with Thanksgiving and Christmas free dinners.....	.....	300,000	300,000

The American social relief institutions for the poor are greater in number than in any other country, and now include 81 workmen's hotels, 6 hotels for women, 15 food depots, 32 industrial homes for the unemployed, 22 second-hand stores, 5 labor bureaus, 3 farm colonies, with nearly 3,000 acres of land and about 400 men, women and children as colonists, 21 rescue homes for fallen women, taking care of 2,000 girls annually. More than 650 children are daily cared for in our various institutions. Work is annually found for about 50,000 of the unemployed with outside employers. Nine hundred and eighty-nine officers and employees are entirely devoted to caring for the poor. In summer, penny ice, summer camps and summer outings have been arranged in most of the large cities. At Christmas and Thanksgiving 300,000 free dinners are given to the poor. The real estate held by the Army in the United States now amounts to about \$1,500,000, its personal property to over \$400,000 and its annual trade turn-over to more than \$200,000. The Salvation Army is incorporated in the State of New York. For the development of its trade a special corporation has been formed

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named the Reliance Trading Company; while the Salvation Army Industrial Homes Company has been incorporated for the extension of its rapidly advancing industrial homes for the unemployed. Training colleges for cadets have been established for the training of officers in New York and Chicago, with a small branch in San Francisco.

The principal literature of the Salvation Army includes the following books: 'Darkest England,' 'Religion for Everyday,' and 'Training of Children,' by General William Booth; 'Servants of All,' and 'Bible Battle Axes,' by Bramwell Booth, and the 'Life of Catherine Booth,' the 'Life of Consul Emma Booth Tucker,' by F. Booth Tucker. Its weekly papers are the 'War Cry,' with a circulation of 75,000, the 'Stridsvopet' (Swedish War Cry) 7,500, the 'Kriegsruf' (German War Cry) 1,500 fortnightly, and the 'Young Soldier,' 26,000, issued for children.

COMMANDER BOOTH TUCKER,
Salvation Army.

Salvator, one of the names of the monitor lizard; and also applied to a South American lizard, the teju (q.v.).

Salve Regina, sāl'vē rē-jī'nā, the first words of a prayer addressed to the Mother of Christ, in Roman Catholic religious services. The words are also applied to the music used in connection with the prayer.

Salvia, a large genus of the *Labiata*, occurring in temperate or warm regions, several living in the southwestern United States. They range in size from herbs to shrubs, in foliage from entire to pinnatifid leaves, and in inflorescence, from axillary to paniced. The flowers are sometimes two inches long, and of nearly every hue except yellow; and the floral leaves are often changed into colored bracts, adding to their brilliance. The genus is remarkable for the arrangements made for cross-fertilization. The blossoms have a two-lipped corolla, two rudiments of stamens and two polliniferous stamens. The latter stand at the entrance to the throat of the flower, have short immovable filaments, and a very long connective between the two anther cells of which the lower is abortive. This connective is crescent-shaped, the horns pointing outward, and rocks upon the filament in such a manner that a bee entering the blossom pushes back the lower arm, and brings down the other on its back, so that the pollen-filled anther cell deposits part of its contents there.

Salvia officinalis, the common sage (q.v.) and many others are cultivated either for savory herbs or for their flowers; or, as in the Clarys (*S. selarea*), for colored bracts; or, as in *S. argentea*, for its woolly white foliage.

Salvini, sāl-vē'nē, Tommaso, Italian tragedian; b. Milan 1 Jan. 1829. He began his studies at Florence but showing a talent for acting, his father, who was an actor, put him under the instruction of Gustavo Modena and at 16 he entered upon his stage career. In 1849 he left the stage to take part in the war of Italian independence, was made a corporal and served throughout the siege of Rome. He returned to the stage the following year and acted in the company with Adelaide Ristori. He soon began the study of those parts that he later played with such success, Orosmane in 'Zaire,'

'Oreste,' the 'Saul' of Alfieri, and Shakespeare's 'Hamlet' and 'Othello.' His success in Italy was such as to warrant him in looking abroad for honors and he next appeared at Paris where the critics were equally enthusiastic in his praise. In 1865 he took part at Florence in the celebration of the 600th anniversary of the birth of Dante, reciting passages from the 'Divine Comedy.' He played in various cities of Spain and in 1871 went to South America to play at Montevideo, Buenos Ayres and Rio de Janeiro. In 1873 he appeared for the first time in the United States, enacting Othello at the Academy of Music, New York, 16 September. In 1875 he appeared in London. He afterward played in many parts of Europe and again in America in 1880, his supporting company being American actors, speaking English while he spoke Italian. He has made five visits in all to the United States; in one of these (1886) playing Othello to Edwin Booth's Iago, and the Ghost to the other's Hamlet. He retired from the stage in 1891. Besides parts already mentioned he has appeared with distinction in the Egisto of Alfieri's 'Merope'; Paolo in 'Francesca da Rimini'; Œdipus in a play of that name written for him by Nicolini; Conrad in 'La Morte Civile'; in 'Samson, The Gladiator,' 'Macbeth,' 'King Lear,' 'Coriolanus,' and finally in 1891 at Florence as Iago. Consult Winter, 'Shadows of the Stage' (1892); 'Leaves from the Autobiography of Tommaso Salvini' (1893).

Salvinia, a genus of an aquatic family (*Salvinaceæ*) of cryptogams. They are floating plants, widely distributed in warm regions and not far removed from the ferns. *S. natans*, common in southern Europe, has a sparingly branched stem lying on the water, and develops three leaves at each node; two of these float as oval, green and papillose foliage, hairy underneath, while the submerged third is divided into numerous hairy filaments, hanging like tassels in the water, and metamorphosed into absorptive organs, that appear to be true roots, but are not. The spherical sporocarps, or sori, are borne near the junction of these filaments with the stem, and are generally in groups of three, each enclosed in a cup-like growth from the filament, like the indusium of a fern, and enclosing unisexual sporangia. The sporangia are composed of either microspores or macrospores. The microspores form antheridia, and liberate spermatozoids which fertilize the archegonia developed by the macrospores. Several species of the *Salvinaceæ* are useful in aquaria.

Salwin, sāl'wēn, Salween, or Saluēn, Burma, the most important river of the country. It has its source in the Tanla Mountains, south of the Kuen Lun, drawing also from the Kara Nor, some of its water. At its source, it is known as Nagtschu, and consists of the united volume of water coming from the glaciers of the mountain streams rising on the Tibetan plateaus. Its name among the Chinese is Lu-Tse-Kiang. The Burmese call it Thanlwin. About 160 kilometres from its mouth appear many dangerous rapids, a great menace to navigation. The current is variable. It is a wild and picturesque stream, whose aspect varies greatly in the dry and wet seasons. After the

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rains the water washes high up the slopes against the trees of the forests; the average difference between high and low water amounting to from 50 to 90 feet. In the lower part of its course, islands also obstruct navigation (not visible at high-water). The worst part is the gorge between the Yonzalin and Kyankhnyat rivers. Many ferries are used to cross the river, and at these points villages are built on the heights above. There are a few bridges in Chinese territory. The Salwin's chief tributaries are the Nam Yu, Nam Oi, Hsipa Haw, Nam Nim, Nam Ting, Nam Kyek, Nam Nang, Nam Kao, Nam Hka, and Nam Pang—its largest tributary,—the Nam Hsim, Mē Sili, and Mē Sala; the Nam Hang, Nam Pan, Nam Teng, Nam Pawn, the Thaung-yin and the Yonzalin. The Salwin cuts the British Shan states almost in two. Kyodam, the great timber depot, lies 30 miles below the junction of the Thaung-yin and the Salwin. A cable stretched across the river at this point catches all the timber (teak), which is made into rafts and floated down to Kado, near Maulmein (where the revenue is collected). From Kyodan southward, and as far as Shwegōn, 63 miles from Maulmein, boats and steamers of light draft can safely navigate. The area of the Salwin basin is 62,700 square miles. Its length 800 miles, breadth from one to four miles.

Salzburg, zälts'boorg, Austria, (1) capital of the duchy or province of that name, occupies a position of singular beauty on the Salzbach, 87 miles southeast of Munich. It lies in a valley from which tower the wooded slopes of the Salzburg Alps. The steep sides of the Mönchsberg rise from the midst of the town, rocky and rugged. In the ancient cemetery of Saint Peter, the vaults are hewn in rocky clefts. Many of the private and public buildings are handsome marble structures, and are suggestive of the Italian. Shady promenades skirt the winding river. The cathedral is a fine specimen of Renaissance, built in 1614-28 in imitation of Saint Peter's. A monument to Mozart, who was born here, stands in Mozart-Platz. The present palace of the archbishops is an imposing edifice, opposite to which are the government offices and law courts. Across the river is the Mirabell palace, once the summer residence of the prince-archbishops. There are 24 churches, a theological seminary and schools, hospitals, fine libraries, a museum, riding schools, etc. Salzburg is a very popular summer resort, which contributes much to its development and progress. A park, theatre, art gallery and baths are among the most recent improvements. There are numerous benevolent and charitable institutions. Salzburg engages in a variety of small manufactures, such as musical instruments, marble ornaments, iron-wares, cement, artificial wool, etc. Its trade is improving. Its origin and development were equally ecclesiastical, its archbishops German princes. The monastery and bishopric founded here (500-700) by Saint Rupert of Worms, was the nucleus of the present town. It has been the scene of several religious conflicts, and is distinctively Catholic. Pop. about 38,000. (2) The duchy covers an area of 2,762 square miles. It is characteristically mountainous with longitudinal valleys intersecting the hills. Of the 200 lakes, Lake Zell is celebrated for its wondrous mountain

panorama. It has many mineral and thermal springs, and valuable mines and forests. Pop. about 200,000.

Salzbrunn, zälts'broon, Germany, a group of three villages in Prussian Silesia, 30 miles southwest of Breslau. It is famous as a watering place and has eight mineral springs. The water is alkalo-saline. Many thousand bottles are exported annually and several thousand persons visit the springs in the season. The water is especially adapted to pulmonary complaints. There are various industrial works, including glass and porcelain factories, wool looms, coal mines, and brick-yards. Pop. 6,459.

Sámal, sã'māl, an island of the Philippines in the northern part of Davao Bay forming the east shore of Pasiputan Strait, length 17 miles, width 13 miles, area 140 square miles. Its general elevation is 820 feet, some parts of the shores are low and wooded, and other portions are high and rocky. The soil is fertile, and chocolate is the chief product; excellent timber is also obtained. The island is well populated, having seven small towns on its western coast.

Samales, sã-mã'lêz, (1) a small tribe of the Philippine Islands, living on the island of Samal in the Gulf of Davao, on the east coast of the island of Mindanao. They are of the Malay race. (2) The name sometimes given to the Moros inhabiting the islands between Basilan and Sulu, Philippines; they are also called Sámales-Laút.

Samana (sã-mã-nã') Bay, an indentation of the eastern coast of Santo Domingo, Haiti, 30 miles long and 10 miles wide. It affords an excellent harbor, being well sheltered and deep, capable of accommodating the largest vessels. The ports of Sanchez and Santa Barbara de Samana are on the north coast. The bay has an important position near the route from the United States to the Isthmus of Panama; in 1870 a treaty was negotiated providing for its purchase by the United States, which the United States Senate refused to ratify.

Samar, sã'mār, an island of the Philippines, the third in size of the archipelago. It lies southeast of Luzon, in the extreme north-eastern part of the Visayan group, and east of Leyte from which it is separated by the narrow strait of San Juanico; length northwest and southeast 156 miles; width 75 miles; area 5,198 square miles, with dependent islands 5,488 square miles.

Topography.—A central mountain chain traverses the island from northwest to southeast, being divided near the centre by the valley of the Ulut River; there is also a group of mountains in the extreme northwest. Their height rarely exceeds 1,700 to 1,800 feet. The island has a number of rivers, of which the largest and most important are the Oras and Ulut on the east, the Bató on the north and the Gándara on the west, and there are four lakes. Among the natural curiosities is an arch over the Basey River formed by two limestone rocks from 34 to 40 feet high. In the rocks on the left a cave opens 37 feet above the water, which is 94 feet deep; it has been partially destroyed by the caving of the rocks overhead. The place is known as the *Cuevas de Sojotón*.

Industrial Resources.—The soil is fertile and adapted to the production of all the staples of

SAMARA — SAMARITAN LANGUAGE AND LITERATURE

the Philippines; the most important products are hemp, sugar, rice and coconuts; the hemp product for export was over 21,000,000 pounds in 1899. Coffee, chocolate, tobacco, and wheat are also cultivated in abundance. A number of medicinal plants grow on the island, the most famous being the one producing the seed called "isigud," or the "fruit of San Ignacio," also known as "Catbalogan seed," because large quantities of it are grown near the town of Catbalogan. This is highly prized by the Chinese as an efficacious remedy for cholera. Valuable timber is found; bamboo and rattan are abundant; and wax and honey are obtained in large quantities. Coal, gold, and copper are found in the mountains, but have not been mined. The raising of horses, cattle, hogs, and goats is an important industry. Sugar and coconut-oil are manufactured, and there are other manufactures for domestic use. Though there are few roads in the island, there is good communication with the interior by means of the rivers which are navigable for native boats. There is also an extensive coastwise trade, and trade with Manila.

People and Government.—The people of Samar are of Visayan blood, representing most fully the characteristics of the Malay race. They are, as a rule, industrious. Some native refugees, about 10,000, live in the mountains, practically independent and savage in their manner and customs. During the last insurrection there was an insurgent stronghold at Sojoton which was captured by United States troops in November 1901. The island of Samar with its adjacent islands was constituted a province, and placed under civil government in 1902, in accordance with the provincial government act of the Philippine Commission. Pop. (estimated 1910) 200,000.

Samara, sā-mā'rā, Russia, (1) capital of a province of the same name, at the junction of the Samara River with the Volga, 550 miles southeast of Moscow. It is the seat of a governor and of a bishop, and one of the main ports of the Volga. Its principal buildings are its churches—mostly Russian—convents, schools and seminaries; theatre, banks, industrial establishments, philanthropical institutions, public libraries, and museums. Its manufactures include machinery, leather, soap, etc. There is an enormous trade in corn, hides and meat, fish and caviare and salt, and a large transit trade between Samara, Khiva, Bokhara and Tashkend. Three markets are held annually. The Koumiss health resorts are celebrated. Pop. about 98,000. (2) The Province of Samara, in the southeast, has an area of 58,302 square miles. At the north it consists of flat low tablelands, interspersed by deep river valleys. The chief streams are the Volga, Tcheremshan, Sok and Samara. The Zheguleff mountains rise opposite the town of Samara, from the banks of the Volga. The remainder of the province is covered by low, flat steppes, excepting two spurs of the Obshchii at the southeast. Agriculture and gardening are the chief occupations of the inhabitants, also stock-raising and bee culture. There is considerable domestic and foreign commerce. The principal fairs are held at Novouzensk and Bugulma. More than an average number of schools are provided. The Serghievsk

mineral springs are much frequented. There is a large German colony. The chief towns are Samara, Bugulwa, Buguruslan, Buzuluk, Nicolayevsk, Novo-Uzeñ, and Stavropol. In 1889 Samara suffered from famine and a great plague and the Russian Red Cross Society cared for 100,000 people.

Samarang, Java, a seaport town on the north coast, 255 miles east of Batavia, the principal port for the trade of Middle Java, since 1873 connected at Surakarta with the Java railway. The European quarters have all the appearance of a typical Dutch town. The more important buildings are a military hospital, the city hall (1854-64), Christian churches and schools. A fort and a coast battery provide defense for the town. The river is silted up at its mouth, but a canal, constructed in 1879, serves as a harbor. The roadstead is exposed during the west monsoon. Pop. about 95,000, including 12,372 Chinese and 4,800 Europeans.

Samaria, sa-mā'rī-a, Palestine, (1) the ancient capital of Samaria, 36 miles northwest of Jerusalem, occupied the acclivity of an isolated and abrupt height—Mount Sameron, which is separated from the surrounding mountains by a rich and well-watered plain. The town rose in terraces from this plain to a height of 400 or 500 feet. Samaria was the capital of Northern Israel from the date of its foundation by Omri, about 925 B.C., to the time of its capitulation to the Assyrians 721 B.C. The site was selected by Omri for a stronghold and capital, as commanding two of the most important high-roads. The situation surpasses greatly that of Jerusalem, though not so picturesque. It commands, however, a charming view toward the Mediterranean, the mountains of Shechem and Mount Hermon. The most important ruins are those of the time of Herod. It was in Samaria that the 10 tribes of Israel founded their independent state after the revolt, perpetuating their mutual animosity by incessant warfare. Thus the name Samaritan became a term of bitter reproach. This antipathy was religious as well as political, but was later mitigated by the return of the Samaritans to the ancient form of worship, and by the erection of a temple, modeled after that of Solomon in Jerusalem, soon after Alexander the Great had passed through Syria. Samaria having been presented by Augustus to Herod, he rebuilt the city which had been the residence of all the kings of Israel till its overthrow by the Assyrians,—calling the new temple Sebaste, in honor of the donor. An old church or mosque, once dedicated to John the Baptist, in the adjacent village of Sebastieh, marks the scene of that saint's burial or martyrdom. (2) Samaria, the name also given to the kingdom of Israel and the subsequent Roman province forming the central portion of Palestine stretching southward from the Plain of Esdraelon, declining south of Hebron, into the desert plateau of Et Tih.

Samaritan Language and Literature, the tongue and literary productions belonging to the inhabitants of Samaria, a region in Central Palestine of indefinite boundaries, possessing a capital of the same name.

Samaritan Language.—The Samaritan language was formed of varied elements gradually collected and assimilated from the Hebrew,

SAMARITAN PENTATEUCH — SAMARITANS

Chaldee, and Syriac. Greek, Latin, Persian and Arabic also contributed words to this dialect which grew up among a people isolated and even secluded in some respects, but through whose territory passed the immemorial trade route which connected Egypt and Africa with Assyria and the far East. Thus roots and heterogeneous scraps of language were jumbled together in the vernacular of an illiterate people, whose grammar was irregular, whose orthography was uncertain; there appears a complete confusion between the gutturals and cognate letters severally; quiescents or silent vowels prevail, and while vowel sounds are uncertain that of *a* is the most prominent. When the Arabians conquered Palestine in the 7th century this language gave place to that of the conquerors excepting among the priests, where it survived as the language of religion and ritual; thus it shared the fate of Hebrew among the Jews, Latin in Italy and the Roman provinces and Sanskrit in Hindustan. Like all Semitic languages it is read from right to left and the alphabet consists only of consonants, namely, *alaf*, *bith*, *gaman*, *dalat*, *i*, *ba*, *sen*, *it*, *tit*, *jud*, *kaph*, *labad*, *mim*, *nun*, *simcat*, *in*, *phi*, *sadi*, *goph*, *rish*, *shan*, *tav*. The two vowels with which certain words begin have a slight consonantal value. There are no accents or other diacritical symbols, and no vowel points as in other Semitic languages, but some consonants are used as vowels. The numbers are written as in Hebrew. The characters appear in two forms one of which is found in manuscripts, the other being confined to engraved inscriptions.

Samaritan Literature.—The literature of the Samaritan people consists of many departments, including Grammar and Lexicography. Three grammatical treatises on the Samaritan language were published from a manuscript at Amsterdam in 1862. They expound the theories of certain Arabian grammarians, from whose philological works whole passages are copied word for word. The Samaritan pronunciation may be judged of by the transliteration of Hebrew words into Arabic. No Samaritan lexicon has yet come to light. The lexicography therefore, of the language is in an inchoate condition. The nearest approach to a glossary is to be found in the fragments of 'Tardeschemans' (interpreters) Hebrew-Arabic dictionaries now preserved in the Imperial Library at Saint Petersburg. There are also at Paris in the Bibliothèque Nationale des Anciens Fonds a concordance of forms occurring in the Scriptures with the Arabic and Samaritan words in parallel columns. The Imperial Library at Saint Petersburg also possesses some Samaritan calendars, or astronomical tables. In legendary lore are several extant manuscripts. The British Museum possesses a 'Commentary on the Legends ascribed to Moses,' which is largely a compilation from Jewish sources. Of a similar character is the 'Jewelled Necklace in Praise of the Lord of the Human Race,' that is, Moses, who is credited with a divine nature, while great emphasis is laid upon the circumstances of his birth and the miracles he wrought. These two are typical of a somewhat extensive Samaritan legendary literature. The Samaritan commentaries on the Pentateuch are many in number, and interesting as showing the doctrines of these

people. It abounds in quotations from the Pentateuch, the prophets and the Mishna, and avoids all references to the Deity which imply an anthropomorphic conception. A number of fragments from such commentaries are also preserved at Saint Petersburg. The Samaritan 'Chronicle or Book of Joshua,' sent to Scaliger by the Samaritans of Cairo in 1584 seems to have revised and redacted into its present form about 1300 A.D. from 4 special manuscripts, 3 Arabic and 1 Hebrew, that is Samaritan. Among other things it relates that "King Joshua" waged war with 300,000 mounted men against two kings of Persia, and was succeeded on his throne by five "royal" rulers—the last being Sampson. The 'Chronicle of Abulfath' covers a period from Adam to Mohammed and is full of the wildest fables. Consult: Ravis, 'A Discourse of the Oriental Tongues, viz., Ebrew and Samaritan, with a Grammar of the said Tongues' (1649); Crinesius, 'Lingua Samaritica ex Scriptura Sacra Fideliter Eruta'; Young, 'Samaritan Root Book'; Nutt, 'A Sketch of Samaritan History.'

Samaritan Pentateuch, an ancient version of the books of Moses, which has been preserved by the Samaritans, and along with the book of Joshua, constitutes their sacred scriptures. The Samaritan Pentateuch is most probably a recension of the same original as that from which the Jewish came, and possesses an independent value in determining the text. It is written in a non-Hebrew character, probably older than that of the Hebrew Septuagint. A manuscript copy of the Samaritan Pentateuch is in existence which is said by the Samaritans to have been written by Abishua, the great-grandson of Aaron. There are various other manuscript copies of this version, besides a translation of it in the Samaritan vernacular and one in Arabic, which after the 7th century superseded Samaritan as the language of the people. The work was known only through Origen, Jerome, and other early writers, until Pietro della Valle discovered a copy of it at Damascus in the 17th century. There are now several printed editions. See SAMARITAN LANGUAGE AND LITERATURE.

Samaritans, so called from the city of Samaria, the capital of the kingdom of Israel, and from Samaritis, the region adjoining that city. The policy of the Israelitish kings was, as a rule, to keep their subjects apart from too close association with the kingdom of Judah, and the breach between the two peoples was made wider, when, after the captivity of Israel, Assyrian colonists inter-married with the remnant left behind by the conquerors, and the Samaritans ceased to be of purely Hebrew descent. The New Testament shows the aversion with which they were regarded by the Jews in the time of Christ, and even to this day when the Samaritans are represented by a few families still worshipping at Mount Gerizim, the dislike with which the Jews look upon them is as strong as ever. The Samaritans claim to be purely Mosaic in their creed, and that the Jews have departed from the ancient teachings of Israel. They worship one God, practise circumcision and the purifications, and keep the feasts, except the Purim and the feast of the Dedication. They look for a Messiah, and believe in a resurrection from the dead, and retribution in a future

SAMARKAND — SAMNITES.

life for wrongs done in the present one. They marry among themselves only, and practise polygamy in a limited degree. See also ISRAELITES; JEWISH SECTS.

Samarkand, sām-ar-kānd' (ancient, MARCANDA), Asiatic Russia, chief town of the Zerashan district, and formerly capital of Sogdiana, in a fertile valley, 130 miles east of the city of Bokhara. The citadel stands at the west and beyond is the newly-built town. The Righistan, or main square, is of unrivaled beauty in its architectural features. The principal buildings are a palace, the bazaars, the Ulug-beg *madrasa*, or college; the tombs of Timur and his wives; two other colleges of the 17th century — splendid buildings, highly decorated with arabesques, enameled tiles of various colors, rich marble, and inscriptions of gold, etc., and 250 mosques. There is a brisk trade, and the chief items of commerce are cotton, silk, wheat, rice, horses, asses, fruit, and cutlery. Gardening is the principal occupation, and there is some manufacturing. Wheat, rice, and silk are exported, chiefly to Bokhara, silk-ware, fine fruits, and rock-salt are imported. Samarkand has been for more than two centuries a great Asiatic mart. As Marcanda, it was taken by Alexander the Great: Timur made it his capital and in his time it contained a population of 150,000. In the 15th century it was celebrated as a school of astronomy and mathematics. It had a checkered history; taken in 712 by the Arabs, who introduced the creed and customs of Islam, it finally fell into possession of the Russians in 1868. Pop. about 60,000.

Sam'arskite, a rare and exceedingly complex, velvet black, nearly opaque mineral. It is distinguished by its dark reddish-brown streak, splendid, vitreous to resinous lustre and conchoidal fracture. Its hardness is 5 to 6, specific gravity 5.6 to 5.8. Its usually rough crystals are rectangular prisms of orthorhombic symmetry. It is a niobate (and tantalate) of iron, uranium, and the cerium and yttrium metals. It is chiefly remarkable for the large number of rare metals which it contains, including samarium, terbium, gadolinium, and the doubtful mosandrum, decipium, and phillipium. Its only European locality is Miask, Russia, but it is found sparingly in Canada, also in the United States in Connecticut, Maryland, and Colorado. The only localities of commercial importance are in North Carolina.

Sambourne, sām'boorn, Edward Linley, English cartoonist: b. London 4 Jan. 1845. He was educated at the City of London School and Chester College, and at 16 became an engineering draughtsman. In 1867 Mark Lemon, editor of 'Punch,' accepted a small drawing from his hand, and he soon formed the connection that has lasted through life. In 1871 he was given a seat at the Table and in 1901 he succeeded Sir John Tenniel as chief cartoonist. He had practically no artistic education, but developed for himself an original style after first showing some inclination to the methods of Leech and Keene. He displayed ingenuity and firmness of touch, and a classic feeling for line. He was perhaps the least humorous of the 'Punch' artists, being weighted with a strain of seriousness and dignity. He illustrated

Burnand's 'New History of Sandford and Merton' (1872); Kingsley's 'Water Babies' (1885); 'Hans Andersen's Fairy Tales' (1887); etc. He died 3 Aug. 1910.

Sambre, sänbär, river of France and Belgium, a tributary of the Meuse. It rises in the northern part of the French department of Aisne, flows between steep and rocky heights, receives several smaller streams, and finally, after a very tortuous course, empties at Namur into the Meuse. The Sambre is 110 miles long. It is navigable from Landrecies for 148 kilometres, and from that point for 67 kilometres is canalized, having 10 locks. The Sambre Canal passes southward as far as Oise, connecting the Seine and Maas.

Sambuke, an ancient musical instrument; though applied sometimes to several musical instruments of different kinds, such as a lyre, a dulcimer, a triangular harp or trigon, and a large Asiatic harp.

Sam'bur, a large deer (*Cervus unicolor*), widely distributed throughout southeastern Asia, and the species of most importance to the sportsman. Large bucks approach five feet in height at the withers, and may exceed 500 pounds in weight. The antlers are large and rough, have the brow-tine sprouting at an acute angle with the beam instead of at or near a right angle, and dividing into two subequal tines at the extremity; the beam sometimes exceeds 40 inches in length in fine specimens from the Bay of Bengal. The color is properly a uniform deep brown, but paler and less handsome hues are often seen; the hair is long and wiry, and forms an erectile mane on the necks of full-grown stags. This deer is an inhabitant of the woodlands, coming out to graze on the hill-slopes, at times, for like the wapiti it subsists mainly upon grass and herbage, but never far from a refuge in the jungle; yet at certain seasons browses the new twigs, or seeks for fruits. There is great variety in their circumstances and habits throughout the wide area of the distribution of this species, and consequently a puzzling amount of variation in their form and appearance, so that several separate species have been without good reason, as further study has shown. Consult Blanford, 'Mammals of India' (1888); Lydekker, 'Deer of All Lands' (1898).

Samian Ware, the name of a kind of ancient Greek pottery made of Samian earth, or to a variety of Roman pottery made in imitation of this. The vases are of a bright red or black color, covered with a lustrous silicious glaze, with separately molded ornaments attached to them.

Sam'nites, an ancient people sprung from the Sabines, and inhabiting the province of Samnium, in Lower Italy. The Samnites are described in Roman history as a people fond of war and of liberty, who were brought completely under the Roman yoke after long and bloody wars, which continued with few interruptions 53 years. After the most fatal defeats, and the entire devastation of their country, the Samnites, together with the other nations which had assisted them, found them-

SAMOA DISASTER—SAMOAN ISLANDS

selves obliged to submit to the supremacy of Rome, 290 B.C. When the Italian allies of Rome revolted against her in the year 90 B.C. the Samnites once more rose against their oppressors, and fought with desperation. But Sulla entirely subdued them, and commanded that every Samnite should be put to death. Three days after the battle he ordered 4,000 of them who had been taken prisoners to be put to death on the Campus Martius. The few that remained lived from that time scattered in villages. The Samnites cultivated various arts and manufactures, for the proximity of the refined Greeks in Lower Italy had a very beneficial influence upon them. Even their laws and constitution were borrowed in a great degree from the Greeks. Their form of government was democratic. At the commencement of a war they were accustomed to choose a common general.

Samoa's Disaster, The. See SAMOAN ISLANDS.

Samoa Islands, The, or Samoa, formerly known as the Navigator Islands, an important group of islands in the South Pacific Ocean, belonging partly to Germany and partly to the United States. They are located about 2,000 miles south of the Hawaiian Islands, in an almost direct line between San Francisco and Australia and slightly south of the direct steamship line connecting the Philippines with the proposed Panama interocean canal. The islands extend from about latitude 13° to 15° S., and from longitude 168° to 173° W. They lie 2,410 miles north of Auckland, N. Z., and about 4,200 miles southwest of San Francisco. The group comprises 14 islands, of which only Savaii (700 square miles), Upolu (500 square miles), Tutuila (200 square miles), and the Manua group (26 square miles) are important. The total area is about 1,700 square miles. The climate is tropical, with abundant rainfall and a mean temperature of 80° in December and 70° in July.

Topography.—All the islands are peaks of a submarine chain of volcanic mountains. Barrier reefs encircle the larger islands more or less, and especially Upolu. Brown and bare in many places at low water, the reefs are submerged at high tide, when the surf booms and bursts upon them in miles and miles of snowy whiteness. Between the outer reef and the shore stretches a lagoon of multi-tinted waters, varying in width from 200 yards to two and three miles. This generally smooth belt of water is, in effect, a canal encircling the islands and is the highway along which all intercourse is had between different points of the islands. In the interior lofty mountains rise, leaving broad stretches of comparatively level land bordering the shore and reaching up to low-lying foot hills. Water courses extend down the mountain side through which the tremendous rains, turning into furious torrents in a few minutes, have cut and cañoned great ravines into the bottom of which no man has ever yet penetrated. In many places the sides of the mountains are not far from perpendicular. Yet such is the climate that they are held in place by the network of growth that covers them. Over such a surface, filling every gap and opening, finding a footing between boulders, no matter how closely packed, shrouding the valley, climbing and capping the peak, is spread a tropic forest of often giant trees, with enormous spreading roots,

gnarled, twisted, of eccentric, fantastic shape. Enormous vines are pendant from the tops, hang from one to another, writhe and twist up the sides and upon the ground, weaving all into an almost solid body, through which a man must cut his way at every step.

Savaii.—Savaii, the most westerly member of the Samoan group, is much the largest and most rugged. It is ridged with lofty, cloud-encircled mountains that are covered with a mantle of dense tropical foliage, giving to them an evenness of outline that delight the eye of the newcomer. The interior of the island, which has never been explored and concerning which little is known, is wholly occupied by mountains. Only a small strip of alluvial land bordering the shore is productive and the island is capable of sustaining a small population.

Upolu.—Ten miles east of Savaii is Upolu, in many respects the most attractive island of the group. Its centre is occupied by a range of hills, the sides of which are covered with vegetation and slope gently down to the sea with many intervening valleys and broad plains. The soil of these slopes is for the most part stony. A comparatively small part of it can be cultivated, but on the lower foot-hills it is largely alluvial and consequently very fertile. Here all the productions of the tropics grow in abundance and the gentle, half civilized natives have made their villages and plantations, where they spend an indolent life, with a minimum of care and labor. Upolu has no perfectly sheltered harbors except those of Apia and Saluafata, upon the north coast, which are anchorages of considerable area. They afford convenient shelter from the easterly trade winds and for the most part are perfectly safe, except during the hurricane season, which includes the months of December, January, February and March. At that time, these anchorages being opened to the north, are exposed to the full fury of the cyclonic storms that annually traverse this region, and blow most heavily from that direction. Upon such occasions great losses occur. Ships are driven ashore, where they break up on the coral reef; sometimes they go down at their anchors.

Tutuila.—About 40 miles off the eastern coast of Upolu lies Tutuila, on the south side of which is Pango-Pango harbor. This is the only land-locked anchorage in the group and affords protection in all kinds of weather to the largest men-of-war or ocean vessels. The land around the harbor is level and well adapted for wharves, warehouses or other structures. It is more suited to steamers than to sailing vessels, since the heavy trade winds sometimes blow directly into the entrance, making it difficult for vessels under sail to leave it. But as a harbor for steamships it probably has no equal among the thousand islands of the Pacific. It lies, moreover, directly in the great circle track between Australia and America, and is, therefore, a convenient calling place for vessels traversing the Pacific.

The Smaller Isles.—Within the sea reef of Upolu lies the Island of Manono, that is little more than a barren rock, but has played a great part in the domestic history of the group. It has always been the cradle of a feudal aristocracy and the focus of native politics. Its chiefs have held a commanding influence in all

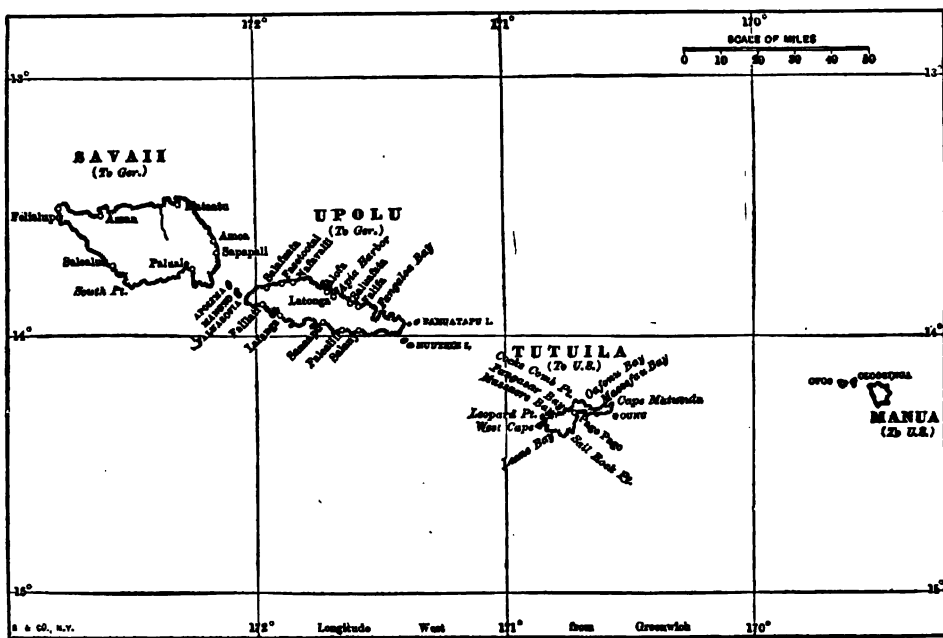
SAMOAN ISLANDS

Samoa affairs. The Manua Islands, three in number and of small area, are 60 miles east of Tutuila. Although they are properly classed with the Samoan group they have little in common with the three larger islands already mentioned save in their language and origin.

Flora and Fauna.—The flora is similar to that of other Polynesian groups, and the fauna is extremely limited. The only indigenous mammal is a species of rat. There are several reptiles, including four species of snake. Among the birds the most remarkable is a species of ground pigeon.

Racial Characteristics.—The Samoans belong to the so-called brown people or Malayo-Polynesians. Although they have always been considered as having affinities with the Malays of the Indian Archipelago, nothing is positively known about their origin. That they are a branch of the Malay race or family is not much

in their faces, giving that melancholy air and meekness which Humboldt first pointed out as a characteristic of the islanders of the Pacific. Their skin is dark olive, resembling polished copper, presenting no difference in the sexes, though the prominent chiefs and better families are much lighter, with smoother skin. They are also taller and more symmetrical in person than the common people. The infant is much lighter in complexion than the adult. The male Samoan is tall, erect and proud in bearing, with smooth, straight, and well-rounded limbs, the contour seldom presenting muscular protuberance or development. Females are generally slight, especially the young girls; erect and symmetrical, easy and graceful in their movements, the charm of light-heartedness seeming to follow every action. Beauty of feature is not the rule; though many of the village maids are exceedingly attractive. Generally the profile is



Map of Samoan Islands.

questioned and they are also remotely allied to the Malagasy of Madagascar. The parent race has disappeared; but that branch from which the Samoans are descended was one of its earliest offshoots, and having remained almost free from admixture of blood, nearly represents the original. They trace back directly to the great Aryan family and their ancestors centuries before the present era emigrated from India and established themselves in the Indian Archipelago, whence they afterward pushed further on into the Pacific. Never having been subject to the inroads of other alien races, and the consequent admixture of blood, the Samoans have preserved uncorrupted and unchanged many of their original racial characteristics. Especially the men—they are of splendid physique, handsome, bright, strikingly erect, sound, healthy, vigorous, and of tremendous strength. Many of the distinctive marks of the European appear

decided and the facial angle distinct, the occiput broad, but seldom elevated. Unlike the Malay, the nose is not artificially flattened, deformity of person never having been practised among them. The nose is usually straight, but not so delicate in structure as that of Caucasians; the mouth large, and the lips thicker than those of the Europeans. The profile of the young girls is often very pronounced; the hair is black, soft, and sometimes fine and wavy, never crisp and curly in either sex. Among the men beards are not so general as among the whites; yet many have luxuriant beards. The eye is black, soft and pleasing.

Industrial Pursuits.—Native industries are few and of the simplest character. Blessed with a soil and climate quite equal to the gratification of their simple desires with little or no exertion on their part, the people are wholly lacking in incentive to labor. They build primitive houses,

SAMOAN ISLANDS

stone fences and canoes, and in war time dig ditches, throw up earthworks and construct forts and palisades; they cultivate the yam and taro and to some extent, since the advent of the whites, collect coconuts and make copra; they manufacture cloth and mats and engage in fishing and in collecting the food that nature offers to them freely for the gathering; that is about the extent of their work. For the rest, it is dancing, singing, fishing, church going and feasting. Undoubtedly the work in which the people have displayed their greatest ingenuity is in the construction of their houses. These are handsome edifices, particularly the fale-tele or council houses that are features of all the villages, and in many instances are of imposing dimensions. The houses are built of the wood of the bread-fruit tree. They are slightly oval, some 25 or 30 feet high. In building them three centre posts are raised, which support a ridge pole, while cross beams are lashed in at different heights, thus binding the structure firmly together. A thatching of sugarcane or pandanus leaves covers the roof. Large houses generally have permanent sides; the smaller ones are open all around, but are curtained by mats.

Education and Religion.—The first Christian missionary visited Samoa in 1830. In 1903 nearly every native had embraced the Christian religion. The observance of Sunday is marked by a rigidity and seriousness that are not surpassed, perhaps even not equaled, in any civilized land. With them Sunday is a day of rest and religious devotion. Food is collected on Friday and prepared on Saturday. On the Sabbath scarcely a boat is to be seen; the hunter is never in the woods during its sacred hours. Attendance upon church meetings affords almost the only sign of life; even the sports of the children are sacrificed, in a large degree, to the strict observance of the day. To a stranger the villages seem deserted. Three denominations have been established in Samoa and there has been strong rivalry between them. All the churches have good schools, those of the London Missions and of the Catholic Church, being especially well conducted and prosperous. At Malua, on the coast of Upolu, 12 miles to the west of Apia, the London Missionary Society maintains a settlement or college that was founded by the Rev. Dr. Turner. The establishment consists of a house for the principal, or resident missionary, a large building which is used as church and schoolroom, and a number of cottages standing in regular order round an open place or square. At Leulumoenga is a college that was established about 1890 for the purpose of educating the sons of the chiefs and of teaching them English. Roman Catholics took the initiative in teaching English. The Protestant missionaries, at first, declined to admit natives who desired to learn English into schools attended by whites and half-castes, nor would they teach English in the native schools. Later they erected near Apia a fine high school or college for Samoan girls of the upper class.

In education, the Samoans have displayed quite as marked proficiency as in their assimilation of Christianity. Probably fully one half of all persons over 20 years of age can read and write. Under that age, all of both sexes, with but few exceptions, are educated to that extent. Beyond this, and the addition of elementary

arithmetic, education does not extend, save to those in the mission schools, who are preparing themselves for the ministry. Samoans are keenly alive to all the advantages of education. Every village, without exception, has its resident pastor, or *fai'fe'au*. This person is at once minister and teacher, regularly teaching the village school besides attending to his ministerial duties. In like manner each village is provided with a building that serves for the purpose of schoolhouse as well as church.

Trade and Commerce.—Cotton, sugar, coffee and coconuts are the leading articles of trade in the islands. The copra of commerce is obtained by drying the kernel of the coconut, the copra, which is exported to Europe and the United States, being used in the manufacture of coconut oil. The exportation of copra from the islands in 1901 amounted to 12,565,909 pounds, valued at \$231,372. A considerable portion of this was exported to the United States, a larger proportion, however, to Germany, whose citizens control its commerce through a trading company which has long been established there. The coconut and copra productions, however, vary greatly from year to year. The imports and exports of the two German islands of the Samoa group in 1901 were \$373,898 and \$241,808. The trade of the American island of Tutuila amounted in the same year to over \$100,000, the exports representing \$25,000. In 1901 over 100 vessels with a tonnage of 200,000 entered the harbor of Pango-Pango.

The Harbor of Apia.—Like all others in the South Sea, the harbor of Apia is a natural one. A coral reef runs almost the entire distance across the mouth of the large bay, leaving only a narrow entrance. The natural obstruction constitutes a perfect breakwater. The harbor is further divided into two parts by a long reef extending directly out from the shore. Upon one side of this reef the water is very shallow and is available only for small trading vessels. The other section of the harbor accommodates the men-of-war and large ocean-going craft. From the harbor Apia presents a long, crescent-shaped line of white houses, glittering in the sun and half hidden in groves of coconut trees. Here and there float the flags of the various consulates and of the business establishments. Half way up the hillside a waterfall tumbles over the rock and is accented so strongly against the dark background of foliage that it can be seen a distance of 10 miles from the shore. Through a small valley near the middle of the bay the water of this river meets the ocean. A nearer view of the place dissipates some of the enhancement that distance has lent to it, but still one finds that it is not without a certain mild attractiveness. The houses are all of wood and in a considerable state of dilapidation. There is practically only one street in the town and that has only one side. The cottages of the foreigners are generally built of California redwood and are picturesquely located along the main thoroughfare that extends parallel with the beach from Matautu to Mulinu; they are surrounded with flowers and tropical plants. On the extreme left, as seen from the harbor, is the American consulate building, with a large, well-built structure with red shingle roof, near it. Further along the beach is the English missionary church, with the

British consulate next to it. Toward the right hand corner of the bay are grouped the buildings used by the German consulate. Native huts and a few small stores make up the rest of the town. There are no wharves and no public buildings of importance. One of the old landmarks by which ships steer their course into the harbor, is the Roman Catholic Mission Church. This is situated near the centre of the town and is of fair proportions, being built entirely of coral block cut from the reefs near by and enclosed within a wall of the same material. Half a mile distant, on a hill in the rear of the church, stands a college and a chapel of the Roman Catholic denomination in which native men are educated to be missionaries.

History.—The islands were first visited by whites in 1721. The French explorer De Bougainville named the group in 1768. In 1787 John F. G. de la Perouse spent several weeks in and around the islands; his experiences with the natives were not altogether agreeable, for on the island of Tutuila Captain de Langle, the second in command of the expedition, with several sailors, was massacred by the natives. In 1839, the famous expedition of Commodore Charles Wilkes, of the United States Navy, made the first thorough survey and exploration of the principal islands of the group. Commodore Wilkes also negotiated an agreement with the principal chiefs by which the interests of the natives and the whalers and traders, visiting the islands from time to time, were provided for. He appointed a consul to represent the United States and took measures to insure amicable relations in the future between the islands and the United States. It is worth pointing out in this connection that this agreement that Commodore Wilkes negotiated was really the beginning of treaty connections between the Samoans and the outside world. A third of a century elapsed after Commodore Wilkes' visit before anything more formal or important developed in the relations of the islanders to the United States or to any European nation. Notwithstanding the steady development of commercial interests in the islands, no serious attempts were made by any nation to obtain a footing in Samoa. During this entire period, however, the islanders had a friendly disposition toward the United States, and later a coaling station at Pango-Pango was secured by the American government.

The native government of the islands had been from time immemorial under the two royal houses of Malietoa and Tupea, except on the island of Tutuila, which was governed by native chiefs. In 1873, at the suggestion of former residents, a house of nobles and a house of representatives were established, with Malietoa, Laupepa, and the chief of the royal house of Tupea as joint kings. Subsequently Malietoa became sole king. In 1887 he was deposed by the German government on the claim of unjust treatment of German subjects, who formed the bulk of the foreign population of the island, and was deported first to German New Guinea and then to Kamerun, in Africa, and finally in 1888 to Hamburg; Tamasese, a native chief, being meantime proclaimed by the Germans as king, though against the protest of the British and American consuls at Samoa. Mataafa, a near

relative of Malietoa, made war on Tamasese and succeeded to the throne.

Meanwhile a commercial treaty was negotiated between a representative of the Samoan government and the United States Secretary of State, William M. Evarts, by which the claim of the United States to the harbor of Pango-Pango as a coaling and naval station was affirmed. Germany followed in the footsteps of the United States in negotiating a treaty, securing to that country practical control of the harbor of Saluafata; the same treaty also gave the Germans unusual commercial privileges and exceptional power in the adjustment of affairs between German residents at Apia and the Samoans. Great Britain also concluded a treaty, securing a naval station and coaling depot and other privileges.

In March, 1889, a terrific hurricane swept over the islands, and a great naval disaster was recorded. Rear Admiral Kimberley, of the United States navy, with his flag hoisted on the Trenton, had arrived early in March and besides the flagship his squadron included the Vandalia and the Nipsic. The German men-of-war at Apia were the Adler, the Eber and the Olga, while Great Britain was represented by the Calliope. On the afternoon of 15 March came the first indication of the hurricane. Late in the day the storm broke with terrific fury. Increasing in violence, by midnight it was a raging gale and by morning a howling tempest. The next morning several of the smaller ships broke loose from their fastenings and either collided with each other or were dashed to pieces on the jagged reefs. The first of the men-of-war to succumb to the storm was the little German gunboat Eber. Colliding sharply with the Nipsic, with a force that almost sent both of them to the bottom, she smashed head on to the reef and almost instantly sank with a loss of 71 lives. The Adler followed with a loss of 20 lives. The Vandalia was wrecked and her commander, four officers and 39 men were drowned. The Olga and the Nipsic were beached and the Trenton wrecked.

In 1889, a conference between the representatives of the American, British, and German governments, was held at Berlin, at which a treaty was signed by the three powers guaranteeing the neutrality of the islands in which the citizens of the three signatory powers would have equal rights of residence, trade, and personal protection. They agreed to recognize the independence of the Samoan government and the free rights of the natives to elect their chief or king and choose a form of government according to their own laws and customs. A supreme court was established, consisting of one judge styled the Chief Justice of Samoa. To this court were referred: First, all civil suits concerning real property situated in Samoa; second, all civil suits between natives and foreigners or between foreigners of different nationalities; third, all crimes committed by natives against foreigners or committed by such foreigners as are not subject to any consular jurisdiction. The capital was located at Apia. A commission was appointed to investigate titles to land alleged to have been purchased from the natives, and this in 1894 completed its labors, confirming about 75,000 acres of land to Germany, 36,000 to British, and 21,000 to Americans.

Malietoa, who had been deported, was restored as king in November 1889, and continued as such till his death, which occurred 22 Aug. 1898, when the consuls of the three powers, with the chief justice as president, took charge of the administration pending the election of a successor. Out of the election and recognition of this successor to King Malietoa, deceased, serious disagreements between the local representatives of the three governments maintaining the joint protectorate over the islands occurred. These were followed in 1899 by a new government between the three nations.

The Treaty of 1899.—The treaty bears date at Washington 2 Dec. 1899, and after reciting its purpose to be to adjust amicably questions between the three powers in respect to the Samoan group, and to avoid further misunderstandings, proceeds textually as follows:

Article I.—The general act concluded and signed by the aforesaid powers at Berlin on the 14th day of June, A.D. 1889, and all previous treaties, conventions and agreements relating to Samoa are annulled.

Article II.—Germany renounces in favor of the United States of America all her rights and claims over and in respect to the Island of Tutuila, and all other islands of the Samoan group east of longitude 171° west of Greenwich. Great Britain in like manner renounces in favor of the United States of America all her rights and claims over and in respect to the Island of Tutuila, and all other islands of the Samoan group east of longitude 171° west of Greenwich. Reciprocally the United States of America renounces in favor of Germany all her rights and claims over and in respect to the Islands of Upolu and Savaii and all other islands of the Samoan group west of longitude 171° west of Greenwich.

Article III.—It is understood and agreed that each of the three signatory powers shall continue to enjoy in respect to their commerce and commercial vessels in all the islands of the Samoan group privileges equal to those enjoyed by the sovereign power in all ports which may be open to the commerce of either of them.

Article IV.—The present convention shall be ratified as soon as possible, and shall come into force immediately after the exchange of ratifications.

In faith whereof, etc.

JOHN HAY.
HOLLEBEN.
PAUNCEFOTE.

A separate treaty was negotiated to cover the provision for the settlement of claims in Samoa. It sets forth that the three governments are "desirous of effecting a prompt and satisfactory settlement of the claims of the citizens and subjects of their respective countries resident in the Samoan Islands on account of recent military operations conducted there, and have concluded a convention for the accomplishment of this end by arbitration."

The king of Sweden and Norway was made arbitrator, and he was not only to determine the amount of claims, but was "to decide to what extent either of the three governments is bound, alone or jointly with the others, to make good these losses."

The nature of the claims to be adjusted is set forth in Article I. of this treaty, as follows:

All claims put forward by American citizens or German or British subjects, respectively, whether individuals or companies, for compensation on account of losses which they allege they have suffered in consequence of unwarranted military action, if this be shown to have occurred, on the part of the American, German or British officers, between the 1st of January last and the arrival of the joint commission in Samoa, shall be decided by arbitration in conformity with the principles of international law or considerations of equity.

There is also a provision to the effect that "either of the three governments named, with the consent of the others previously obtained in every case, may submit to the king for arbitration similar claims of persons not being natives,

who are under the protection of that government, and who are not included in the above-mentioned categories."

The chief advantage obtained by the United States in this agreement is that the island of Tutuila contains the harbor of Pango-Pango, one of the finest in the South Pacific, and which cuts the island nearly in two. Tutuila is 17 miles long by 5 broad. The United States gave no *quid pro quo* for the Island of Tutuila either to Germany or Great Britain; but Germany surrendered a large amount of territory and other important rights to Great Britain in return for the latter's surrender of rights in Samoa. Germany gave up the portion of the Solomon group which she owned, and consented to a division of the neutral zone in West Africa, giving to Great Britain the territory about the mouth of the Volta River, which British diplomats long tried in vain to obtain. On 12 Jan. 1900, Malietoa addressed a protest to the governments of the United States, Great Britain and Germany against the Samoan treaties. He characterized the partition of Samoa as a gross violation of the treaties and as a crime against the law of nations, only equal to the dismemberment of Poland, Denmark, and France. During the Boer war in South Africa, Great Britain surrendered her remaining rights in Samoa to Germany, which country with the United States possessed the islands in 1903.

Government.—Germany governs Savaii and Upolu and the adjacent islets, and the United States, Tutuila and the Manua group. German Samoa is administered by an imperial governor, and a native chief, assisted by a native council. The American possessions are in charge of a naval governor.

Population.—The aggregate population of the islands in 1903 was about 38,000, of which something over 200 were British subjects, 300 Germans, 100 Americans, 25 French, and 25 of other nationalities, while the remainder were natives of the Polynesian race. The bulk of the population was located in the three principal islands, the number in Upolu being 16,600, in Savaii, 14,000, and in Tutuila, 5,800.

WILL M. CLEMENS,

Editorial Staff, 'Encyclopedia Americana.'

Samokrischtchins. See RELIGIOUS SECTS.

Samos, sā'mōs, now Samo, or Sousam-Adassi, an island in the Ægean Sea belonging to the Grecian Archipelago. It is 45 miles southwest of Smyrna, and is separated from the coast of Asia Minor by a narrow channel, Little Boghaz, and from Nikaria and the Furni Islands by the Great Boghaz. It covers an area of 213 square miles and has several good harbors on the coast; it is traversed by two rocky and barren mountain ranges, relieved by some forests of pines, with vineyards and olive groves on the lower slopes. The valleys are well-watered and fertile, and contain beautiful scenery. Samos is tributary to Turkey to the extent of paying an annual stipend to the sultan, but is otherwise governed by a Greek prince nominated by the Porte. The capital and chief city is Vathy, on the north side. The old capital, Khora, is a poor place on the south side. This was the site of the famous temple of Hera. The island is extensively cultivated, produces excellent Muscadine wine, corn, fruit, and vegetables.

The minerals include silver, lead, antimony, calamine, manganese, and copper. Samos is renowned as the birthplace of Pythagoras and other distinguished men. It was formerly inhabited by Ionian Greeks. The chief exports are wine, brandy, raisins, hides, leather, oil, tobacco, and carob-beans.

Samosatenes, or **Samosatians**, a heretical sect, followers of Paul of Samosata, bishop of Antioch, from 260 to 274 A.D. He denied the divinity of Jesus Christ, saying Jesus was simply man, though favored with the indwelling of the Logos from the instant of his conception: by the unvarying conformity of his will to the Divine will, he became like unto God, and through love he became one with him. His doctrine was condemned as impious by three councils of bishops, the third of which by decree deposed him, 269 A.D.; but Paul would not comply with the decree, till at last, after the overthrow of his great patron, Zenobia, queen of Palmyra, it was enforced by order of the Emperor Aurelian, 274 A.D., who declared that the controversy had been determined by the judgments of the bishops of Italy and in particular the bishop of Rome. The Samosatenes are also called Paulinians.

Samothrace, *sām'ō-thrās*, or *sā-mō-thrā'sē*, or **Samothraki** (Turkish, *Samadrek*), an island of the Ægean Sea, about 40 miles northwest of the entrance to the Dardanelles, and nearly opposite the mouth of the Hebrus, 36 miles from the coast of Thrace. It is rugged and mountainous and of almost oval form; its highest summit, Saece, reaches an elevation of 5,248 feet. On the northern coast are sulphur springs of considerable renown. The principal products are grain, wood, oil, honey, and wax, and on the coast there is a considerable sponge fishery carried on by traders from Smyrna. In the northern part of the island the ruins of ancient Samothrace were found (1873-5) consisting of Cyclopean walls; a Doric temple of marble, and another of circular form. Samothrace was of importance from early times, and is frequently mentioned in the works of Pliny, Homer, and others. Here Poseidon witnessed the contests between Greeks and Trojans on the plains of Troy. But its chief renown was due to its having been the seat of worship of the Cabiri, and to its religious mysteries, supposedly derived from the Pelasgians. The island is once mentioned in history in connection with the expedition of Xerxes, one of its ships having taken a conspicuous part in the famous battle of Salamis. The island was first colonized by Phœnicians, afterward joined by Greeks. It always enjoyed autonomy, partly owing to its sacred character, partly to its lack of political importance—due to the fact of its having no good harbor. Saint Paul visited the island in the course of his second missionary expedition (Acts xvi. 11). The inhabitants are mostly Christians. Pop. 4,600.

Sam'ovar, a Russian tea kettle, the water in which is boiled by means of hot coals contained in an iron tube, and then poured over the tea.

Samoyedes, *sām'oi-dēz*, or **Samoiedes**, a Mongolian people inhabiting the shores of the Arctic Ocean, from the Kamin Peninsula, on

the eastern shores of the White Sea, in European Russia, to the Gulf of Khatanga, in the northeast of the government of Yeniseisk, Siberia. They consist of three principal tribes, speaking different dialects. Their origin is unknown, but they are supposed to have come from more southern regions, and have been erroneously confounded by the Russians with the Laplanders, whose country, called in the Lapland tongue *Sameanda*, has probably given them their name. They are nomadic, and live chiefly by fishing, hunting, and keeping reindeer. Their principal wealth consists in herds of reindeer, which supply them with food, clothing, tents, utensils, etc. They are of small stature, usually between four and five feet; have a flat, round, and broad face, thick lips, wide nose, little beard, black hair, in small quantity. They are extremely superstitious, and generally peaceable. They are unacquainted with the art of writing, their traditions being imperfectly preserved only in their songs. When Russian expansionists first became acquainted with them they had already been driven from their native seats by the Tartars, and separated from their kindred tribes.

Samp, originally an Indian article of food consisting of maize, broken or bruised, which is cooked by boiling, and eaten with milk.

Sam'pan, a boat of various build used on the Chinese rivers, in Straits Settlements and elsewhere, for the conveyance of merchandise, and also frequently for habitation. They are swift sailers both with oar and sail.

Sam'phire, an umbelliferous plant (*Crithmum maritimum*), pale-green with bi-triternate leaves and fleshy very succulent leaflets, and umbels of small yellowish flowers followed by fennel-like fruits. It grows wild along the rocky shores of northwestern Europe, near the water, and when abundant, is used as a pickle, salad, or potherb. It can also be cultivated in gardens, if not too far from the coast, and if supplied with plenty of salt and soda solutions. The name is a corruption of the old French 'herbe de Sainte Pierre,' and it is also called in England Saint Peter's-wort.

Sample, Robert Fleming, American Presbyterian clergyman: b. Corning N. Y., 19 Oct. 1829; d. N. Y. City, 12 Aug. 1905. He was graduated from Jefferson College in 1849. From 1853 he was engaged in various pastorates in Pennsylvania and Missouri until 1868 when he assumed charge of the Westminster Presbyterian Church, New York, where he remained and was pastor emeritus from 1902 till his death. He was professor of Christian ethics in Lincoln University, was editor of 'North and West' in 1895-1902, travelled widely in Europe and Palestine, and was connected with numerous religious educational and religious organizations. He published: 'Early Dawn' (1861); 'Beacon Lights of Reformation' (1889); 'Elements of Pulpit Power' (1901); etc.

Samp'son, Archibald J., American diplomat: b. near Cadiz, Ohio, June 1839. He was graduated from Mount Union College, Ohio, in 1861, served through the Civil War in the Union army, attaining rank as captain, was admitted to the bar in 1865, and settled in Seda-

La. Mo., where he engaged in law practice. He removed to Colorado in 1873, became attorney-general in 1876 and in 1880-93 was United States consul at El Paso del Norte, Mexico. He established his home at Phoenix, Arizona, in 1893, and since 1897 has been United States minister to Mexico.

Sampson, Deborah, American heroine: b. Plymouth, Mass., 17 Dec. 1760; d. Sharon, Mass., 29 April 1827. She served in the Continental army for three years during the Revolutionary War, disguised as a man and bearing the name of Robert Shurtleff. She gained a reputation for coolness and courage in action and was engaged in many daring enterprises. She was wounded by a sabre cut on the temple in a skirmish near Tarrytown and later was shot through the shoulder. During the Yorktown campaign she was seized with brain fever and her sex was discovered. She was discharged by Washington, receiving from him a note and a purse of money, and later was invited to the capital, where Congress voted her a pension and a grant of lands. She published her experiences under the title 'The Female Review' (1797).

Sampson, William Thomas, American naval officer: b. Palmyra, N. Y., 9 Feb. 1840; d. Washington, D. C., 6 May 1902. In 1860 he was graduated from the United States Naval Academy, where he had been the highest officer of the cadet battalion. His first assignment was on board the frigate Potomac. He was promoted lieutenant 16 July 1862, and two years later became executive officer on the ironclad Patapsco of the South Atlantic blockading squadron. He held the watch, 15 Jan. 1865, on the turret roof of the Patapsco when that vessel was blown up and sunk by a torpedo in Charleston harbor. Only his own coolness saved his life in that catastrophe. He became lieutenant-commander in 1866, and commander in 1874. In the autumn of the last-named year he was detailed for the third time as instructor at the Naval Academy, and remained there four years in charge of the department of physics. Later he became assistant-superintendent of the Naval Observatory, and in 1884 was a member of the International Prime-Meridian and Time Conference at Washington. He was superintendent of the torpedo station at Newport, 1885-6; representative to the International Marine Conference at Washington in 1886; and superintendent of the Naval Academy, 1886-90, where he introduced great improvement in the state of training. In 1889 he was promoted captain, and later put in command of the San Francisco, the first steel cruiser of the new navy. During his term as chief of the Bureau of Naval Ordnance, 1893-7, the use of smokeless powder was perfected by experiments conducted under his supervision. Upon quitting this post he was put in charge of the battleship Iowa, which had been placed in commission in June 1897, and with this ship he took his place as senior captain in the North Atlantic Squadron. On 17 Feb. 1898, two days after the battleship Maine was blown up in Havana harbor, he was appointed president of a board of inquiry directed to investigate the causes of that disaster. On 22 March the investigation was concluded

and Capt. Sampson, promoted to the rank of acting rear-admiral, succeeded Admiral Sicard in command of the North Atlantic Squadron. Upon the declaration of war with Spain, 21 April, he was ordered with his fleet to blockade the northern coast of Cuba. A few days later the Navy Department was informed of a Spanish fleet under Admiral Cervera having sailed from the Cape Verde Islands toward Cuba. Admiral Sampson was forthwith ordered to intercept this fleet in its supposed progress to the relief of Havana. On 1 June he arrived off Santiago, where the Spanish fleet had meantime been located, and at once effected a strict blockade. On 3 June, under his orders, an unsuccessful attempt was made by Naval Constructor R. P. Hobson and others to prevent egress of the Spanish fleet by sinking the Merrimac in the channel-entrance to the harbor. On the morning of 3 July Sampson had withdrawn on the flagship New York, and was proceeding to Siboney for a conference with Gen. Shafter, the commander of the land forces, when it was discovered that the Spanish ships were leaving the harbor of Santiago. The New York was put about and, under full steam, overtook the blockading fleet already giving battle under the direction of Commodore Schley, commander of the flying squadron, and second in command of the blockading fleet. The entire Spanish fleet was destroyed, and Admiral Cervera was captured. After the close of the war a long and bitter newspaper discussion ensued over the question whether the chief honors of this victory belonged to Sampson or Schley. A court of inquiry which met three years later, at the request of Schley, decided against his claims, but the controversy prevented Congress from awarding any official recognition to Sampson for his success. For two years from October 1899 Admiral Sampson held command of the Boston Navy-Yard. In October 1901 he was placed on waiting orders; his health was much impaired; he was retired from active service 9 Feb. 1902, and resided in Washington until his death.

Samshui, China, a treaty port in the province of Kuang-tung, situated on the river West, about 100 miles west of Canton. The town is small, but favorably situated for foreign trade.

Sam'son, one of the judges over Israel. He was of the tribe of Dan, and the circumstances attending his birth, heralded as it was by an angel, his consecration as a Nazarite, and those visitations of the Spirit of the Lord through which he was enabled to perform feats of heroic might, marked him out as a man raised up to meet a national emergency. The first recorded instance of the exercise of his great strength is in connection with his marriage to a daughter of the Philistines. At the wedding-feast Samson proposed a riddle to the guests, wagering 30 shirts and as many suits of clothes that they could not guess it in seven days. The secret of his riddle being betrayed to them by his wife, Samson went to Askalon, killed 30 Philistines, and gave their clothes to his guests. His wife having, during his absence in his own country, married again, he caught 300 foxes, and tying them together tail to tail, with a fire-brand between them, let

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them loose in the fields of the Philistines. His own countrymen bound and delivered him into the hands of his enemies, but he snapped the cords asunder, and killed 1,000 Philistines with the jaw-bone of an ass. From this period Samson was judge of Israel for 20 years. While on a visit to Gaza the gates of the city were closed upon him by the Philistines, whose intention it was to kill him, but he rose and carried off the gates to a distance of 20 or 30 miles. Not long after he fell in love with Delilah, to whom he revealed the secret of his strength, and she by cutting off his hair, deprived him of his powers, and betrayed him to his enemies, who put out his eyes, and set him to work in a mill with slaves. At a great festival in honor of Dagon Samson was brought out to furnish sport to the Philistines. But his hair had grown again, and his vigor having returned with it, he took vengeance on his enemies by pulling down over their heads the building in which they were assembled. Milton has made his death the subject of a drama — 'Samson Agonistes' (1671), Handel that of an oratorio, 'Samson' (1743) — and his exploits have been illustrated in the woodcuts of Dürer, and the paintings of Guido Reni, Rembrandt, and Rubens.

Samson Agonistes, āg-ō-nīs'tēz ('Samson the Combatant'), a sacred drama published by John Milton (q.v.) in 1671. It shows Samson, as according to the Scripture narrative, blinded and bound, but at the last triumphant over the Philistines.

Sam'uel, Hebrew judge and prophet about 1140 B.C., whose rule preceded the establishment of the kingly office. His name, in Hebrew 'Shemuel,' meaning 'asked from,' or 'heard of God,' is explained by his story as a child. He was the son of Elkanah, of Ramathaim-zophim, belonging to the tribe of Levi, by Hannah. Hannah had been barren previous to the birth of Samuel, but she prayed earnestly to the Lord for a man-child, and vowed that if her petition were granted she would consecrate the child to the Lord all his days. Her prayer being heard she took her son to Shiloh to surrender him to the high-priest to be trained to the service of the Lord. The boy grew up devoted to the temple service; but after the death of Eli nothing more is heard of Samuel for a space of about 20 years, while the Ark, restored by the Philistines, was in the house of Aminadab. He then exhorted the Israelites, when they were hard pressed by the Philistines, to abandon their idolatry, and to fear God and worship Him, as their only means of deliverance. His prayers and sacrifices gained for them the victory at Mizpeh, and it is probable that from this time, and in consequence of the leading part Samuel then took, he obtained the name and authority of judge. It is recorded that he judged Israel all his life, going a yearly circuit from Ramah, where was his home, to Bethel, Gilgal, and Mizpeh. At Ramah he built an altar to the Lord. His administration was distinguished by the restoration of the neglected worship of Jehovah. He also established schools of the prophets. In his old age the corruption of his sons, to whom he had transmitted the active duties of the office of judge, excited dis-

content among the Hebrews, who demanded a king. Samuel reluctantly yielded to this revolution, but at the same time anointed the king of the general choice. After the establishment of the monarchy Samuel still continued to be judge in matters affecting morals and religion, in addition to the exercise of his prophetic functions. In his bearing toward Saul Samuel conducted himself with wonderful dignity and kindness. He earnestly desired that Saul, as king, should rule well in the fear of the Lord, and that his dynasty should be permanent. When Saul attacked the priestly office and privileges Samuel anointed a new king, David. He did not live to see the contest between David and Saul decided; but even after his death his spirit, evoked by the witch of Endor, threatened Saul with the divine vengeance. See **SAMUEL**, **BOOKS OF**.

Samuel, **Books of**, two books of the Old Testament, which are one book in Hebrew manuscript, the division into two books being first introduced by Bomberg, at Venice, in 1518. That the prophet and judge Samuel did not write the books as a whole is made evident by the fact that his death is recorded in Book I, chapter xxv. There is a common opinion, however, that Samuel wrote the previous chapters, and the statement in I Chronicles, xxix. 29: "Now the acts of David, the king, first and last, behold they are written in the book of Samuel the seer, and in the book of Nathan the prophet, and in the book of Gad the seer," leaves no doubt that Samuel did write a book, and his eminent position among the leaders and prophets of Israel would make it most probable that the book had been preserved. As to the portions of which Samuel was certainly not the writer, it is manifest that they were written very near to the events which they describe, and that they do not belong to the more recent period of Jewish national history. It is regarded by high authorities as probable that the books were written soon after the death of David and before the secession of the 10 tribes under Jeroboam. The books are of great historic value; they are clear and simple in style, and they bear proof of accuracy in narration, and of assurance on the part of the writer that he was stating facts within the general knowledge of his contemporaries. See **DAVID**; **JEWS AND JUDAISM**; **JUDGES**, **BOOK OF**; **SAMUEL**; **SAUL**.

Consult: Driver's work on the text, and the commentaries on Samuel by Delitsch, Keil, Otto Thenius, and Hensler Konigsfeldt.

Sam'uels, **Samuel**, American seaman: b. Philadelphia 14 March 1823; d. Brooklyn, N. Y. 18 May 1908. At the age of 11 he went to sea as cabin boy, and became a captain at 21. He was for some years captain of the Dreadnaught, the fastest of sailing packets. During the Civil War he commanded the United States steamer John Rice (1863-4) and the McClennan, at the capture of Fort Fisher (1865). He was captain of the Fulton, the last of the American packet steamships between New York and Havre (1866), and gained international fame by winning the first ocean yacht race with the Henrietta (December 1866). He organized in 1872 the Samana Bay Company of Santo Do-

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range, but his concession was revoked in 1874. Till his death he was identified with large business interests in New York and Brooklyn.

Samurai, the feudal warriors of Japan, who, prior to the revolution of 1867-8, comprised about one sixteenth of the population, and are now represented by the *shizoku*, or knights. They were distinguished by indomitable courage, their marvelous feats of arms, fervent patriotism, intense loyalty, and a strong antipathy to foreigners, which was in marked contrast to the hospitable and courteous demeanor of the mass of the population. They were the military retainers of some 276 daimios or feudal chieftains, the more powerful among whom were those of the southern clans Satsuma, Choshu, Tosa, and Hizen. After the re-opening of foreign relations due to United States initiative in 1854, the enlightened Japanese discovered at once that to place themselves commercially and politically on a level with the progressive nations of the world they had to adopt Occidental methods, and the prominent chiefs and their samurai were the first to advocate the suppression of the Tokugawa shogun, the supremacy of the mikado, the surrender of feudal powers, and a reorganized administration for the building up of a constitutional monarchy, most of which was effected by the revolution of 1868.

The samurai expected that the military and naval services would be exclusively reserved for them and their descendants. The radical measures adopted in 1871, however, led to the total abolition of feudalism, and the absorption of the samurai into the mass of the people, in many cases with a praiseworthy self-abnegation, but in others not without serious opposition. That of the famous Saigo of Satsuma, hitherto one of the most prominent reformers, culminated in the civil war of 1877, and the total defeat of the samurai and their pretensions. See JAPAN.

C. LEONARD-STUART,

Editorial Staff, 'Encyclopedia Americana.'

Sam'vat, a method of reckoning time in India, generally used except in Bengal. Christian dates are reduced to Samvat by adding 57 to the Christian year. See CALENDAR.

San Andres, sãn än'dräs, or **Pico de Orizaba**, Mexico, an extinct volcano, called by the Aztecs Citlalepetl, or Mountain of the Stars, 6½ miles southeast of the city of Orizaba. It is 5,550 metres high, and the loftiest mountain of Central America. Its highest pass, Cuchilla, has an elevation of 4,418 metres, snow-line of 4,292 metres; the deepest glacier, El Corte, 4,015 metres. It was first ascended in 1848, by two American officers, Reynolds and Maynard. Its last eruption extended from 1545-66.

San Angelo, an'jël ô, Texas, town, county-seat of Tom Greene County; on the Concho River, and on the Gulf, Colorado & Santa Fé railroad; 180 miles northwest of Austin. It is the centre of a prosperous stock-raising and wool-growing region; agriculture is also carried on successfully in the vicinity; fruit and celery being important products. The town contains flour mills and an ice factory. There are three national banks with a combined capital of \$300,000. It has an elevation above sea-level

of 2,000 feet, and is a health resort, especially for consumptives. There is a public high school established in 1889. Pop. (1890) 2,615; (1900) 2,700; (1910) 10,321.

San Antonio, Texas, city, county-seat of Bexar County, and the largest city in the State, is on the San Antonio River 150 miles from the Gulf coast and about the same distance from the Rio Grande border at Laredo. This quaint and picturesque old Spanish city is beautifully laid out on a plateau 661 feet above the sea-level, along both banks of the San Antonio, a few miles from where it bursts forth—at once a river of volume and great natural beauty—from hundreds of crystal springs, in a noble woodland park. Through the western part of the city runs a smaller stream flowing out of another group of sparkling waters, situated in a live-oak grove, known as San Pedro Springs.

Railroads.—The Southern Pacific, International and Great Northern, Missouri, Kansas and Texas, San Antonio and Aransas Pass and San Antonio and Gulf railroads pass through the city, and the extension to it of the Frisco main line is assured, making it a great railroad centre, from which four distinct lines penetrate into Mexico.

Water Works and Sewer System.—The San Antonio Water Works Company, a private corporation, has established a thoroughly modern system, with an investment of over \$2,000,000, and 120 miles of mains. The water is obtained from 13 large artesian wells, furnishing a daily supply of 38,000,000 gallons of wholesome water. The company also owns riparian rights around the head springs of the San Antonio River and has a large reservoir adjacent on a hill, kept fully supplied for any emergency. The sewer system cost the city some \$550,000. It has 80 miles of sewers, constructed after the most approved engineering science, and meeting the latest sanitary requirements.

Street Railway and Lighting.—The traction company has 60 miles of well built electric lines with modern equipment and excellent service. There is also maintained a complete plant for gas and electric lighting and power, with all the necessary mains and supply lines.

Parks and Plazas.—There are 22 cultivated parks and plazas in the city, under the management of a park commissioner; and it is renowned for the exquisite beauty of its natural parks and the attractive features of its old Spanish plazas. Brackenridge Park, situated adjacent to the head springs of the San Antonio River, is a noble forest of 200 acres, left in its natural state of oak, pecan, and shrub growth, and containing miles of well kept walks and drives. In this park there is maintained a rare collection of buffalo, deer, antelope, elk, and other wild animals. San Pedro Springs is another favorite resort, with lakes, shady groves and an excellent "zoo." Seventeen iron bridges span the serpentine windings of the river in its 13 miles' course through the city, giving picturesque views at many points.

Many of the quaint characteristics of the old Spanish *régime* are still to be found in the public plazas, fragrant with their tropical trees and plants and famous for their Mexican chile and tamale stands, and in the narrow streets in the old parts of the city, still called by their liquid

Spanish names. The San Antonio Club, country fishing and hunting associations, golf links and tennis grounds afford recreation for the society world; the military reviews and artillery drills of the large garrison at Fort Sam Houston draw crowds of visitors; and the annual spring carnival and battle of flowers on San Jacinto day have made San Antonio as noted as the Mardi-Gras spectacles have New Orleans.

Public Buildings.—Among the public buildings are the court-house, costing \$700,000; the Federal building, \$300,000; the market house and convention hall, with a seating capacity of 4,000 \$60,000; and the city-hall, \$210,000. Mention may also be made of the Grand Opera House, the San Fernando Cathedral, part of which was built in 1749, the Saint Mark's Cathedral, the new hospital, the Menger Hotel, whose open courts are filled with tropical plants, palms and flowers; and numerous stately and ornamental business blocks.

Commerce, Banking, and Manufactures.—The unique situation of San Antonio, 200 miles from any rival business centre, has given it a commanding position as to the trade of a large section of Texas and Mexico. Large wholesale houses, 12 in number, push their business through a territory larger than the State of Illinois. The city possesses about 150 manufacturing establishments, including two very large breweries, several machine shops and foundries, flouring mills, binderies, cotton presses, cement works, broom factories, oil mills, etc., and their products are distributed through a vast section. There are six national banks in San Antonio with a combined capital of \$1,600,000, and deposits of over \$7,000,000; there are also six private banks, two of which are of large capital, and which altogether contain deposits of some \$3,000,000. The city is a prominent cotton market and is the financial centre of the most extensive stock interests in the Southwest. San Antonio is surrounded by many acres of irrigable farms, with water supplied by numerous artesian wells obtained at an average depth of about 1,200 feet. Truck gardening is here conducted on an extensive scale, largely by Belgian gardeners, and the products are shipped to the northern markets, where they are months ahead of similar products from other sections.

Churches and Education.—San Antonio has two beautiful cathedrals and 55 other churches, divided as follows: 13 Methodist, 12 Roman Catholic, 8 Presbyterian, 5 Episcopalian, 5 Baptist, 3 Lutheran, 3 Evangelical, 2 Jewish, 2 Christian Science, 2 Christian, and 2 Y. M. C. A. The public schools are under the control of a school board elected by the people. There are 21 school buildings, valued at \$500,000, and 150 teachers (including 23 colored), whose annual salaries amount to nearly \$88,000. The total enrolment for 1902-3 was 8,242. There are also located in the city and its suburbs 30 private schools and colleges, making it one of the most important educational centres in the South. These private institutions contain several thousand pupils. The Carnegie Library, established through the liberality of Andrew Carnegie, occupies a building constructed at an expense of \$50,000 on a site valued at \$15,000. It is under the control of a board of trustees; has endowment funds of

\$10,000 invested, the income of which, together with a special tax of some \$5,700 annually levied under a special provision of the city charter, maintains its work.

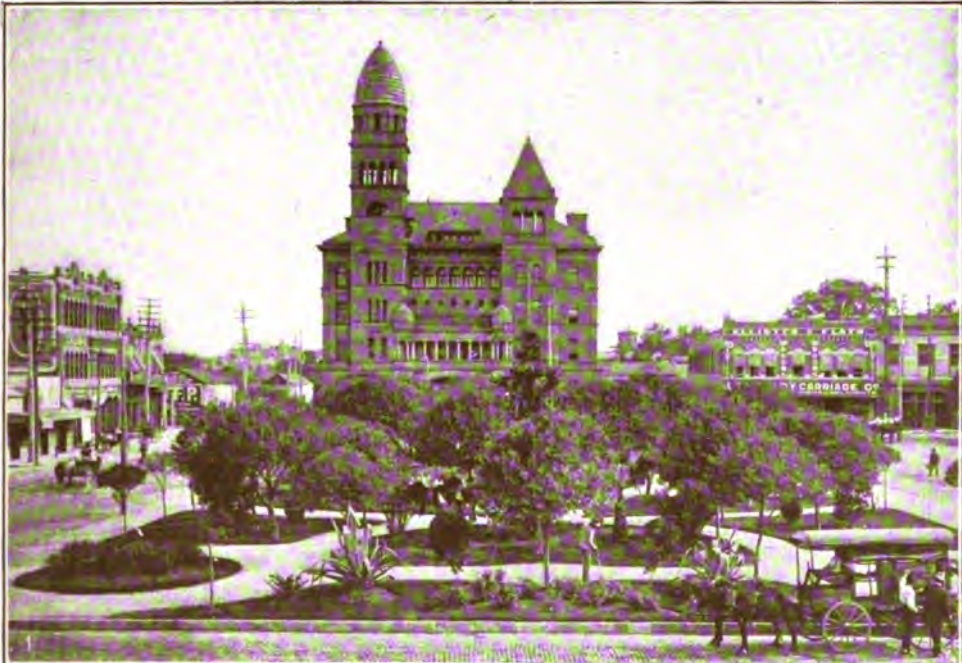
Government.—The administration of municipal affairs is under a charter granted by the Legislature in 1903. Under the charter a mayor is the chief executive officer, assisted by a council composed of four aldermen at large and one alderman from each of the eight wards into which the city is at present divided. The mayor and aldermen are elected for two-year terms, as are also the city attorney, tax assessor, collector, treasurer, auditor and judge of the corporation court. An excellent paid fire department and a thoroughly efficient uniformed police force are maintained. The assessed valuation of property in the city for taxable purposes in 1910 was \$73,814,590. The total tax rate for city and school purposes, \$1.42. Under the State organization there are held in San Antonio three district courts, one of them with criminal jurisdiction, a court of civil appeals of three judges, a county court with probate jurisdiction and two justice of the peace courts, and under the Federal jurisdiction district and circuit courts.

Suburban Attractions.—There are several attractive suburban additions, not strictly included within the city limits, such as West End, Alamo Heights, and the Hot Sulphur Wells. These are all noted for their handsome improvements and beautiful surroundings. The Sulphur Wells Company has an elaborate bathing pavilion where medicinal, Turkish and vapor baths are given, with all the usual massage accompaniments, and a modern, well conducted hotel for its patrons. There are also in close proximity to the city other medicinal, hot sulphur and chalybeate artesian wells, notably the Terrell and Dullnig properties, whose remarkable curative qualities are well established.

Climate.—The altitude of the city is 661 feet above the sea-level at the main plaza; at Fort Sam Houston on the government hill it is 768 feet. The average annual temperature is 68°; mean maximum in summer, 79°; mean minimum in winter, 57°. The air is dry, bracing and aseptic, the average relative humidity being 65°. The summer heat is tempered by a strong current of air which blows for nearly eight months almost constantly from the Gulf, making the summer nights delightful. The winter climate most of the time resembles, in its salubrity and temperature, that of Cairo, Sorrento, or the Riviera, varied at times by a norther, which stimulates like a tonic. The attractions of the climate, the wealth, refinement, and hospitality of its cosmopolitan people, its quaint and artistic beauty, and its interesting historical associations and landmarks make San Antonio one of the most charming, picturesque, and notable cities in the Union.

History.—The first Spanish settlement at San Antonio grew out of the fierce rivalry between Spain and France for the possession of Texas. There were probably temporary military encampments made on the site of the present city by the exploring expeditions of Alonzo de Leon and Domingo Teran, in the latter part of the 17th century; but the real beginning of the city dates from 1716, when the presidio (garrison) of San Antonio de Bejar (or Bexar,

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1. Court House and Main Plaza.

2. City Hall — Military Plaza.

pronounced Báy-bar) was established on the San Pedro Creek, within the present city limits, by Don Domingo Ramon.

Two years later followed the Franciscan mission of San Antonio de Valero, and in 1722 both the presidio and mission are found firmly settled on the Plaza de las Armas, now the military plaza of the modern city. In 1730, under a royal decree issued with a view of colonizing the new military and religious settlement, 15 families were brought from the Canary Islands, the head of each raised to the dignity of a hidalgo, and all located adjacent to the presidio, where, around what was then called the Plaza de las Yslas and now constitutes the main plaza, they proceeded to establish the pueblo (or villa) of San Fernando de Bejar. The mission of San Antonio de Valero was afterward, in 1744, removed half a mile farther east to the site still occupied by the historic chapel of that mission, known as the Alamo, and forever hallowed as the scene of the desperate and tragic struggle of 6 March 1836. From these various names of the presidio, mission, and pueblo, respectively, there has been evolved by some gradual blending process the modern name of San Antonio de Bexar, the affixed name having, under the State organization, been finally given to the county.

While Texas was a Spanish and Mexican province, San Antonio, called indiscriminately in those days San Antonio and Bejar, was most of the time the capital and always an important military station. During the long war of the revolution of Mexico against Spain, the old city witnessed many scenes of fierce strife and cruel bloodshed. Revolutionists and royalists engaged in bitter contests for the possession of the city, amidst scenes of unparalleled atrocity. In 1811 the head of Nicolas Delgado, a prominent adherent of the revolutionary party, was stuck upon a pole on the main street, after his cruel execution by order of the Spanish governor, Salcedo. On 29 March 1813, the battle of the Rosillo was fought a few miles from the city, in which the royalist army, under Governor Salcedo, was defeated, with the loss of 1,000 men, by Mexican revolutionists and American adventurers under Gutierrez and Kemper. San Antonio at once fell, and a junta of revolutionary chiefs ordered butchered immediately in cold blood, in revenge for the execution of Delgado, the governor, Manuel de Salcedo, Governor Herrera of New Leon and 15 other Spanish officers who had surrendered. On 4 June 1813, General Elisondo with a royalist force of 1,500 was defeated on the heights of the Alazan, one mile west of the city, after a desperate battle, by the revolutionists and Americans under Gutierrez and Colonel Perry.

The famous Spanish general, the Marquis of Arredondo, now marched on San Antonio with a new army of 2,000 men, and 18 Aug. 1813, met the republican forces commanded by Toledo and Perry, near San Antonio, on the Medina, and, after a furious contest, defeated them amidst frightful carnage. Arredondo immediately entered the city with his triumphant army, and proceeded to make the most cruel exactions and bloody reprisals upon the patriot population. Private property was confiscated; 600 citizens were crowded into narrow and unwholesome

prisons, where many died through suffocation; others were at once shot, including all the male members of the Delgado family, not sparing even a boy of nine years; hundreds of women of the best families were imprisoned in the Quinta and compelled to grind corn for Arredondo's army. These bitter contests and periodical revolutions nearly ruined the city; and it was not until the independence of Mexico was finally won in 1821 that its prosperity began to revive. By 1823 its population had increased to nearly 5,000.

In 1835 the revolution of Texas against the dictatorial government of Santa Anna (pronounced Sant' Anna) broke out. A Texan force of 800 men under Burleson and Milam advanced upon the city, then under the command of General Cos, with an army of 1,400 men, and, after a siege of a month, the city was gallantly stormed by the Texans, losing in the assault their courageous leader, Ben Milam. On 10 Dec. 1835 Cos surrendered his entire command, with 21 pieces of artillery, and large stores of ammunition and supplies. During the succeeding winter the city was held by a small force of Texans under the command of Wm. Barret Travis, assisted by such heroic spirits as the renowned frontiersman, Davy Crockett of Tennessee, James Bowie, who had lived several years in San Antonio and had married there Governor Veramendi's daughter, and the chivalrous Colonel Bonham of South Carolina. The dictator, Santa Anna, in February 1836, completed his vast preparations for retaking San Antonio, and marched from Monclova with a force of nearly 6,000 men, the *élite* of the Mexican army. Learning of his near approach, Travis, with 145 men, subsequently increased by volunteers to a total of 179 men, retired from the presidio on the military plaza and established his little command in the abandoned mission-fortress of the Alamo. Santa Anna took possession of Bejar 23 Feb. 1836, and rapidly completed the investment of the Alamo, surrounding the mission on all sides. He had three brigades of infantry under Generals Sesma, Tolsa, and Gaona, a cavalry command under Andrade, and ample siege artillery directed by General Ampudia. The hardy Texans had not only their deadly rifles to depend upon, but also 14 pieces of artillery which had been mounted by their Mexican predecessors on the church itself and on the walls surrounding the rectangular court of the mission. These walls have long since disappeared, but the site of this court is the northern part of the present Alamo plaza. Here, then, for 10 days, took place the most memorable, thrilling, tragic, and sanguinary siege in American history; 179 indomitable American frontier riflemen against an army of 6,000 brave and disciplined troops, led by veteran officers. After many desperate assaults and bloody repulses, on 6 March 1836, four storming columns of 2,500 picked troops, led by Cos, Duque, Romero, and Morales, amidst death-dealing volleys and horrible carnage from the murderous rifles and artillery of the Texans, finally succeeded in scaling the walls. The heroic defenders fought desperately hand to hand, from wall to courtyard and courtyard to buildings, until the last man perished, there being no survivors of the dreadful massacre but two

SAN ANTONIO—SAN BERNARDINO

women, two children, and two servants. Santa Anna's total losses in this desperate siege were estimated by Alcalde Ruiz, who superintended the burial of the dead, at 1,600, of which over 600 were killed or died of wounds.

It was on this sacred spot, thus baptized by the blood of heroes, that San Antonio elected to receive President McKinley on the occasion of his visit in 1901, and there to tender the Chief Magistrate of the country the enthusiastic welcome of its people. In 1840-65 Comanche Indians came into the city to enter into negotiations with Texas commissioners for a treaty of peace. A row broke out in the council house over the surrender of white prisoners; fierce fighting began in the building and continued into the plaza and streets until 32 Indian warriors were killed and all the rest of the party captured. Seven Texans were killed and eight wounded in this bloody contest. In the fall of 1840, 18 dead bodies were brought in from the edge of town and laid out in the court-house. Nineteen young men had gone out riding for pleasure and had been surprised by a sudden attack of Indians and all had been killed but one, and their bodies left stripped and horribly mutilated.

Mexico still kept up hostilities against the new republic, and 11 Sept. 1842 a Mexican army of 1,300 men under General Adrian Woll surprised the city and captured it, making prisoners of 52 of the most prominent citizens, including the venerable judge of the district court and the entire bar of lawyers. They were driven on foot in front of mounted guards, a cruel and toilsome march of over 1,000 miles, and imprisoned at hard labor, chained together in couples, for nearly two years in the castle of Perote, in the state of Vera Cruz. Woll, who had remained in San Antonio with his main army, was badly defeated a few days later by Colonels Hays and Caldwell and 220 Texans, in a desperate battle on the banks of the Salado, five miles east of the city, and was obliged to beat a hasty retreat into Mexico.

Military Post.—From the close of the Mexican War to the present time—save during the Civil War—San Antonio has been a military station for troops and generally also the headquarters of the army in Texas. The present military post of Fort Sam Houston and headquarters department of Texas, located on a commanding site in the northeast part of the city, occupying some 310 acres, is one of the largest in the United States, and its construction has cost upward of \$1,000,000. The government is now (1904) expending \$500,000 on additional grounds and quarters, and when these improvements are completed a full garrison will be maintained of one regiment of twelve companies of infantry and band, two batteries of field artillery and one squadron of four troops of cavalry. A United States arsenal for storage of ordnance supplies and the manufacturing and repairing of equipment is situated in the southwestern part of the city.

Population.—The city has shown a marvelous development since the Civil War. Its growth, by the Federal census, has been as follows: (1870) 12,266; (1880) 20,255; (1890) 37,673; (1900) 53,321. In 1910 the census bureau reported that the population was 96,614,

an increase of 81 per cent, which placed San Antonio nearly 4,000 ahead of any other Texas city.

Bibliography.—Cortés, 'San Antonio de Bexar'; 'San Antonio' (1890); 'Bancroft's account of the Storming of Alamo and other references to San Antonio'; 'Fall of Alamo' (pamphlet); 'Memoir of Mary A. Maverick,' one of the first white women to live in San Antonio; Spanish documents and reports in Bexar archives, touching Arredondo's victory and operations and various points in early history.

EDWIN H. TERRELL,

Former United States Minister to Belgium.

San Antonio, a river in Texas, which has its rise in Bexar County, formed by the confluence of the Medina River and Leon Creek. It flows east through three counties, a distance of about 200 miles, and enters Espiritu Santo Bay, an inlet of the Gulf of Mexico.

San Bernardino, sãn bër-nâr-dē'nō, Cal., city, county-seat of San Bernardino County; on the Southern Pacific and the Santa Fé R.R.'s; about 70 miles from the Pacific coast, where the transcontinental railroads break through the mountains. Many electric lines connect the city. It was settled in 1851 by Mormons; was incorporated as a town in 1868 and chartered as a city in 1886. It is west of Mount San Bernardino, in a rich agricultural and mining region, where fruit grows in abundance. The chief industrial establishments are the Santa Fé railroad shops, lumber mills, grain elevators, and factories in which are made crates for the shipment of fruit. There are about 1,400 men working in the railroad shops and on the trains. The city makes extensive shipments of fruit, grain, and lumber. San Bernardino is a famous health resort both summer and winter, on account of the equable climate, the beautiful scenery, and the variety and abundance of fruit. The principal public buildings are the court-house, the hall of records, the hotels, banks, the seven churches, the Southern California State Hospital for Insane, and an orphan asylum. The educational institutions are Saint Bernardine of Sienna Academy, a high school, public and parish schools, and a private business college. The five banks have a combined capital of \$355,000, and deposits amounting to \$2,000,000. The government is vested in a board of trustees elected every four years. Pop. (1890) 4,012; (1900) 6,150. After 1900 there was a marked growth. Pop. (1910) 12,779.

R. C. HARRISON,

Editor 'The Sun.'

San Bernardino, (1) a range of mountains in the southwestern part of California; an extension of the Coast Range. (2) A mountain peak of the San Bernardino Range; the highest mountain of the Coast Range, and the peak which has given name to the group of mountains to which it belongs. The height is 11,604 feet.

San Bernardino, a strait of the Philippines between the extreme southeastern point of Luzon and northwestern Samar, connecting the Pacific Ocean with the Visayan Sea. It is of commercial importance as forming the eastern end of the Verde Passage between the United States and Manila.

SAN BLAS → SAN FRANCISCO

San Blas, blās, Mexico, in the territory of Tepic, situated on the Pacific coast southeast of the mouth of the Rio Grande de Santiago. It is the terminus of the Mexico-Guadalajara Railway, and an important port. The industries are ship-building and lumbering. Pop. 2,000.

San Carlos, kār'lōs, Chile, town in the province of Nuble, in the northern part of the state, on the main railway of Chile, 15 miles northeast of Chillan. Pop. 7,051.

San Carlos, Philippines, pueblo, province of Pangasinán, Luzon, on a tributary of the Agno River, 10 miles southeast of Lingayén. It is the centre of four main highways, and near the Manila & Dagupan Railroad. Pop. 23,950.

San Carlos, Order of. See ORDERS, ROYAL.

San Cristobal de los Llanos, krēs-tō'bāl dē lōs lā'nōs, or *Ciudad de las Casas* (City of Las Casas), Mexico, largest city of the state of Chiapas, lies northeast of the capital, Tuxtla-Gutiérrez. It occupies a high (1,981 metres), fertile, and beautiful valley on the eastern slope of the central mountain range. It is the see of an archbishop, and has a cathedral, several convents, seminario conciliar, or university, a grammar school, and a hospital, and a handsome capitol. It has an active trade, especially in coffee; it also has manufactures of earthenware and coarse textiles. The chief occupation, however, is cattle-raising. The town was founded in 1528, on the site of the ancient Zacatlan, and named in honor of the celebrated priest Las Casas. Pop. 16,050.

San Diego, dē-ā'gō, Cal., city, port of entry, county-seat of San Diego County; on San Diego Bay, and on the Atchison, T. & S. F., the Coronado, the National City & O., the San Diego, C. & E., and the San Diego, P. B. & L. J. R.R.'s; about 120 miles southeast of Los Angeles. It has steamer connections with the principal Pacific ports of the United States, Hawaii, Japan, and the Philippines. Its landlocked harbor and facilities for interior transportation rank it next to San Francisco as the most prominent port in California. The climate is remarkably equable and salubrious, and it is a favorite health resort. It is the commercial centre of a region in which are produced large quantities of nuts, fruit, and honey. It has flour and planing mills, machine shops, carriage and wagon works, and several other industrial establishments connected with the harvesting and sale of the natural products of which large shipments are made each year. The principal public buildings are the government building, the library, Saint Joseph's Sanatorium and Home for the Aged, several bank buildings, the churches and schools. The educational institutions are Academy of Our Lady of Peace, Saint Anthony's Old Mission Indian Training School, a high school, public and parish elementary schools, and a public library.

The bay was discovered in 1542, but the first mission in California, founded by the Franciscan Fathers, was established here in 1769. The city was laid out in 1867. Several ruins from the old mission days are of interest. On a sand-spit enclosing the harbor is a village of fine

residences called Coronado after the well-known hotel. Pop. (1910) 39,578.

San Domingo, sãn dō-mēng'gō. See SANTO DOMINGO.

San Domingo Indians, a Pueblo tribe of New Mexico. See QUERES.

San Felipe, fā-lē'pā, Chile, an agricultural town in the province of Aconcagua, 60 miles northeast of Valparaiso, in the fertile valley of Aconcagua.

San Felipe Indians, a Pueblo tribe of New Mexico. See QUERES.

San Fernando, fēr-nān'dō, Chile, the capital of the province of Colchagua, and a railway junction, 80 miles south of Santiago. Pop. about 8,500.

San Fernando, Philippines, (1) Pueblo, province of Cebú, on the east coast, 16 miles southwest of Cebú, the provincial capital; pop. 18,200. (2) Pueblo, province of Pampanga, Luzon; on the Manila & Dagupan Railroad, five miles northeast of Bacolor. It is the railroad shipping point for Bacolor, with which it is connected by highway; and is an important centre of the sugar industry, containing sugar mills and warehouses. It also has an extensive wholesale and retail trade in groceries and drugs; pop. 13,270. (3) Pueblo, capital of the province of Unión, Luzon; on San Fernando Bay; 45 miles north of Dagupan. It is on the coast highway, and also on the projected route for the continuation of the Manila & Dagupan Railroad. It has also frequent communication with Manila by sea. Fishing is an important industry; pop. 13,270. There are three smaller pueblos of the same name: (a) pueblo, province Ambos Camarines, Luzon, a road centre with good trade; pop. 3,270; (b) pueblo, Ticao Island, province of Masbate, also known as Bután; pop. 2,367; (c) pueblo, province of Zambales, Luzon, on Bancal Valley highway; pop. 453.

San Fernando, Spain, on the Isla de Leon, seven miles southeast of Cadiz, in the province of Cadiz; is a fortified town built in modern style. It has two churches, two hospitals, a naval academy and workshops, an extensive arsenal, a fine observatory, and an iron foundry. It has numerous domestic industries and a brisk trade in salt.

San Francisco, sãn frān-sīs'kō, the largest city in California, and the largest on the western coast of America, or in the United States west of the Mississippi River, ninth in rank as to population in the United States; seventh seaport in commercial importance; is situated on a very hilly peninsula between the Bay of San Francisco and the Pacific Ocean; on the south side of the strait known as the "Golden Gate"; lat. 37° 48'; lon. 122° 27'. It is the principal seaport on the Pacific coast of the United States, possessing the only commodious harbor, excepting that at San Diego, south of Puget Sound. The Bay of San Francisco forming this harbor is entered by a strait about three miles long and one to two and a half miles wide, navigable for the very largest ships regardless of tides. The harbor itself is completely sheltered from dangerous winds on all sides; it is about 90 miles long and from 5 to

15 miles wide, and contains excellent anchorage ground and abundance of deep water. It is supplied with drydocks and every facility for the care of vessels. The city is connected with regular lines of steamship: (1) with all ports on the Pacific coast of North and South America, the distances in nautical miles to the principal points in the North being: Portland, Ore., 653; Seattle, Wash., 804; Vancouver, B. C., 833; Juneau, Alaska, 1,608; Sitka, Alaska, 1,784; the distances to the principal ports to the South being: San Pedro, port for Los Angeles, 393; San Diego, Cal., 482; Mazatlan, Mexico, 1,478; Acapulco, 1,836; Guaymas, 1,954; Panama, 3,473; Valparaiso, 6,606; (2) with the Atlantic seaports and Europe *via* Cape Horn, the distance being: to New York, 13,380; to Hamburg, 14,076; (3) with Hawaii, Japan, China, and the Philippines, the distances being: Honolulu, 2,100; Yokohama, 4,525; Shanghai, 6,000; Hong Kong, 6,100; Manila, 6,250; Singapore, 7,850; (4) with Samoa, New Zealand, and Australia, the distances being: Apia, 4,200; Auckland, 5,930; Sydney, 7,210. The city is also connected by rail with all points north and south on the Pacific coast, and all points in the Middle West and east of the United States, the distances being by shortest mail route: to Seattle, 808 miles; to Los Angeles, 482 miles; New Orleans, 2,490 miles; to Chicago, 2,357 miles; to New York, 3,269 miles.

History.—The site of San Francisco was first visited by Europeans in the autumn of 1769. Under date of 28 Nov. 1775, Bucarell ordered a fort, presidio, and mission founded on the Bay of San Francisco. The expedition to carry out this order left Monterey 12 June 1776, and arrived on the peninsula 27 June. Part of the equipment was sent by sea on the San Carlos, and arrived on 18 August. The ceremony of taking formal possession was held on 17 September. The ceremonies attending the founding of the mission at San Francisco were held on the 9th of the following October. Vancouver, in his 'Voyage Round the World' (iii. 9), describes the settlement as it appeared in 1792. The presidio represented the military authority, while the pueblo and the mission stood for the civil and religious factors respectively. The earliest towns of California were organized under the laws of Philip II. And "when a pueblo was once established, no matter how or by whom composed, and officially and legally recognized as such, it came immediately within the provisions of the general laws relating to pueblos, and was entitled to all the rights and privileges, whether political, municipal, or of property, which the laws conferred upon such organizations or corporations" (Cal. Rep., 15, 541); and "among these rights was the right to four square leagues of land, in the form of a square, or in such other form as might be permitted by the nature of the situation" (Cal. Rep., 35, 432). Since San Francisco was bounded on three sides by water it was impossible for the town to have four square leagues of land in a square; a line was, therefore, drawn across the peninsula from east to west, and "the four square leagues (exclusive of the military reserve, church buildings, etc.) north of this line, constitute the municipal lands of the pueblo of San Francisco" (Cal. Rep., 16, 230). Before 1834 the territorial governor and the mili-

tary commandant of the presidio conducted the government of the town. The former imposed license fees and taxes, and the latter acted as a judge of first instance. A little later an ayuntamiento was formed, composed of an *alcalde*, two *regidores*, and a *stndico*. Between 8 Jan. 1838 and February 1840 the ayuntamiento was abolished, and the government of the town passed into the hands of justices of the peace. After the American occupation the ayuntamiento was re-established. Commodore Montgomery, after he had raised the flag of the United States at San Francisco, appointed Lieutenant Washington A. Bartlett to be the first *alcalde* of San Francisco under the new regime. Before the American occupation the *alcaldes* acted as judges of first instance, and they in a large measure made the law which they executed, "at least, they paid but little regard either to American or Mexican law further than suited their own convenience, and conduced to their own profit." In 1847, a common council of six persons was elected, and held its first meeting in September of that year. With this the *alcalde* assumed some of the functions of a mayor. He presided at the meetings of the council, and could give a casting vote in case of a tie, but could not participate in the discussion. At this time the police force of the town consisted of two elected constables. The next year, 1848, gold was discovered. After the news had become known, the town appeared as if it had been suddenly stricken with a plague. "Its houses were left unoccupied and unprotected; its former trade ceased; its lots fell to a small part of their value; its two weekly newspapers, 'The Californian' and 'The California Star,' were suspended in May and June; and the town, deserted by the bulk of its inhabitants, was at one time without a single officer clothed with civil authority" (Moses, 'The Establishment of Municipal Government in San Francisco,' 35). But in October 1848 an election was held and the town government was reconstituted. At an election held on 1 Aug. 1849 there were 1,516 votes cast, and John W. Geary, candidate for the office of first *alcalde*, received the whole number.

The town was incorporated 15 April 1850. California had already adopted a constitution but it had not been admitted into the Union. The first municipal election under the charter was held 1 May, 1850. The common council held its first meeting on 9 May, and proceeded at once to plunder the city treasury. It proposed to fix the salary of the mayor at \$10,000 a year; and at the same sum the salaries of the recorder, the marshal, and the city attorney. The other officers, including the members of the council, were to have salaries ranging from \$4,000 to \$6,000 annually. After the admission of California to the Union as a State, the city was re-incorporated 15 April 1851, and the essential forms of the pre-existing government were retained. When the mail steamer Oregon, brought the news that California was admitted to the Union the inhabitants were "half wild with excitement."

"Business of almost every description was instantly suspended, the courts adjourned in the midst of their work, and men rushed from every house into the streets and towards the wharves, to hail the harbinger of the welcome news. When the steamer rounded Clark's Point and came in front of the city, her masts literally

MAP OF SAN FRANCISCO

Scale
0 1/4 1/2 3/4 1 Mile

GOLDEN GATE

(2 3/4 Miles Long
1 1/4 Miles Wide)

El Winfield Scott

ANITA ROCK

PRESIDENTIAL
RESERVATION

CITY
CEMETERY

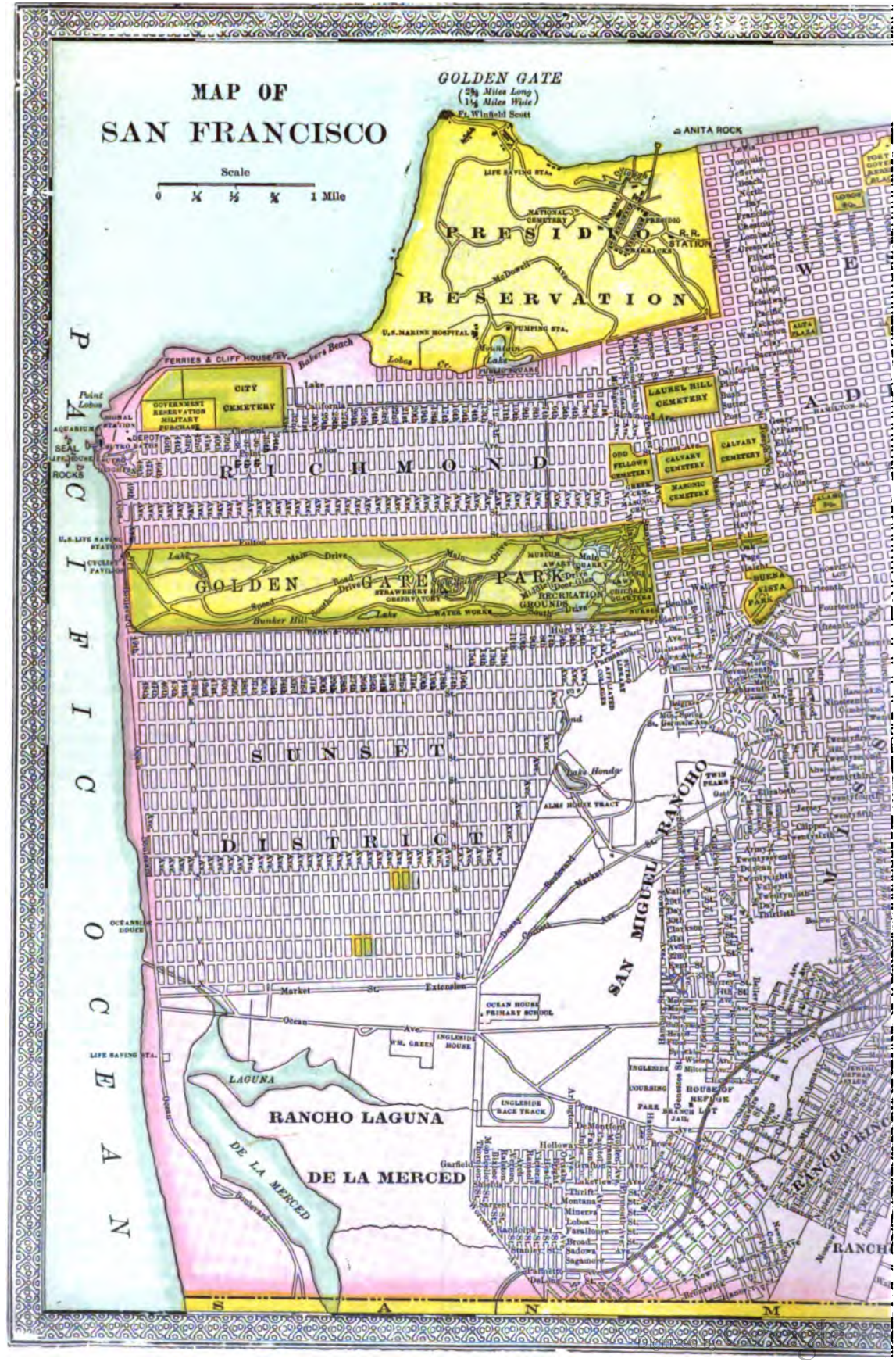
GOLDEN GATE PARK

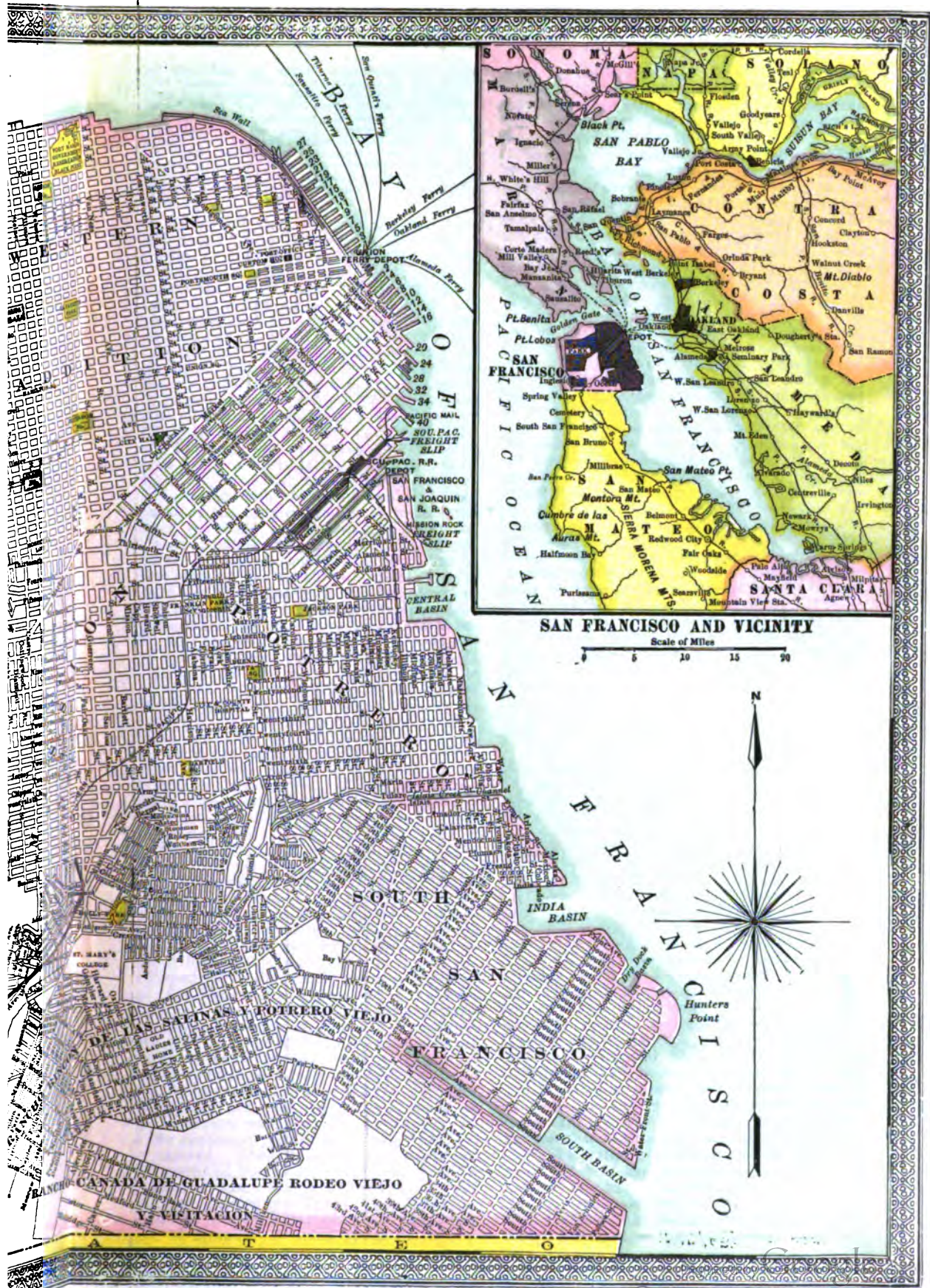
SUNSET
DISTRICT

RANCHO LAGUNA

DE LA MERCED

SAN MIGUEL RANCHO





SAN FRANCISCO

covered with flags and signals, a universal shout arose from ten thousand voices on the wharves, in the streets, upon the hills, house-tops, and the world of shipping in the Bay." And "at night every public thoroughfare was crowded with the rejoicing populace. Almost every large building, all the public saloons and places of amusement were brilliantly illuminated—music from a hundred bands assisted the excitement—numerous balls and parties were hastily got up—bonfires blazed upon the hills, and rockets were incessantly thrown into the air, until the dawn of the following day." (*Annals of San Francisco*, 293.)

In its early history the city suffered from several fires. These occurred 24 Dec. 1849, 4 May 1850, 14 June 1850, 17 Sept. 1850, 4 May 1851, and 22 June 1851. Two effects of these fires were the use of better materials in building and the formation of various hook and ladder, engine, and hose companies. They also called attention to the fact that the city was full of criminals who were making profit out of the fires. This fact and the recognized inefficiency and corruption of the city government led a large number of citizens to organize the famous "Vigilance Committee" which flourished in 1851. In August 1850 the Society of California Pioneers was organized. Its declared purpose was "to cultivate the social virtues of its members, to collect and preserve information connected with the early settlement and conquest of the country, and to perpetuate the memory of those whose sagacity, enterprise, and love of independence induced them to settle in the wilderness, and become the germ of a new State." The great production of gold, while it led immediately to the abandonment of the city, was the first important ground of its prosperity. As the output of the mines became more and more abundant, prices rose, imports multiplied, and the population increased; but in 1854 the rise had culminated and the flood of gold began to decline. It then became clear that speculation had outrun safe limits, and there followed a severe crisis in mercantile affairs. By 1856 the crime and corruption which were rife in the city had become intolerable to those who wished to live in a decent and orderly community. Affairs reached a critical stage when Mr. King, editor of the *Bulletin*, was murdered by James P. Casey. His vigorous denunciation of crimes and the criminals who infested the city had given great offense. This act was the final incentive to action. The memory of the Vigilance Committee of 1851 was revived, and a new organization effected. On Monday Mr. King died, and on Tuesday Casey and another murderer by the name of Cora, who had killed United States Marshal Richardson, were tried by the executive committee of the recently formed organization. On Wednesday Casey and Cora were hanged in front of the Vigilance headquarters. After several months of activities in defiance of the law, the committee disbanded, having rid the city of many criminals and purged it of much of its political corruption. Although there was a decline in the yield of gold in the years between 1854 and 1860, there was at the same time a marked extension of agriculture; by this the continued prosperity of San Francisco was assured. Then followed the marvelous development of the silver mines. They brought a sudden increase of wealth, and led to a large amount of excited speculation. San Francisco reaped the principal harvest from the silver mines of Nevada. A small group of its citi-

zens acquired immense fortune from this source. Their wealth may be compared with that of another small group of San Franciscans who became very rich as the chief leaders in the overland railway enterprise.

General Description.—San Francisco has 47 square miles of territory, or about 30,000 acres, within the municipal limits. Many of the streets, especially in the northern and western parts of the city, are very steep, and the hills are mounted by cable cars, a system invented or first applied here by A. S. Hallidie. The present total mileage of street car tracks is 280. The finest residences are on "Nob Hill" and "Pacific Heights," both districts commanding superb views of the Bay and the Golden Gate, and in Van Ness Avenue, a broad street, 125 feet wide, running north and south near the geographical centre of the city. The commercial district is in part on made ground facing the harbor on the eastern side of the peninsula and on the comparatively level ground to the south-east. The mission district to the south and in the centre of the peninsula, named from the old Spanish mission situated there, is also a favorite residence quarter. Market Street, a broad thoroughfare 120 feet wide, runs from the water front by a gradual ascent into the interior of the peninsula in a southwesterly direction. The streets to the north of Market Street cut the city into rectangular blocks, running north and south and east and west, hence at acute angles to Market Street. Those to the south of Market Street are parallel to or at right angles to that street. The city is thus cut into two distinct portions locally known as South of Market Street and North of Market Street. The district to the south is occupied by manufacturing establishments and the homes of laborers, that to the north is occupied by shops of the better sort and by the homes of the clerks, the merchants, and the capitalists.

Parks.—San Francisco has six large and many small parks, 32 in all, which are carefully kept and rendered especially attractive by their palms and semi-tropical flowers. As there is no winter frost, the plants and trees in the parks are in almost constant foliage and grow to unusual perfection. The largest and finest park is Golden Gate Park, which occupies 1,014 acres. It begins about the centre of the city, and extends in a broad sweep to the ocean on the west. It is laid out in beautiful winding boulevards over and around the hills. It contains a museum, a large music stand, a Japanese tea garden, a children's playground, a chain of lakes, a buffalo paddock, a deer paddock, an aviary, and bear pen. At the northwestern corner of the peninsula, overlooking the ocean, lie the extensive private grounds known as Sutro Heights, and on the rocky shore not far off the sometime celebrated Cliff House, which has commended itself to visitors not merely for its café but also as offering an excellent view of the rocks where the seals are accustomed to rest in the sun. Nearby is also the extensive bathing establishment known as Sutro Baths, to which the water is admitted directly from the ocean and held and warmed in immense tanks made of concrete. The baths are 500 feet long and 250 feet wide, and hold 1,804,962 gallons. The "Presidio," the military reservation of the United States; is on the northeastern corner of

SAN FRANCISCO

the peninsula, and embraces 1,500 acres. The reservation contains the barracks, officers' quarters, and other buildings needed for the troops of the Department of California.

Climate.—The climate of San Francisco is very equable, frost and snow appearing so rarely as to be practically unknown. On one occasion, 31 Dec. 1882, snow fell three inches deep and lay on the ground for about 24 hours, which is the only real snowstorm known. In summer the temperature is kept low by the cool winds from the ocean. Only 14 times in 30 years has the temperature risen above 90° F. Once in June 1891 it reached 100°. The average of maximum temperatures in June, July, August, and September is about 70°; that of the minimum temperatures in the same months is about 56°. The greatest daily variation is about 43°. The lowest temperature on record was in January, 1888, which was 29°. The range of temperature during the entire year is 60°, that is from the coldest night in winter to the warmest day in summer. The mean temperature for July is 59.5°; January 46.1°; for the year about 56°. The greatest daily variation is about 30°. Rain falls in the winter months only. Showers begin in October. The heaviest storms come in December and January, but the rains usually cease in the beginning of April. Very rarely, however, rain has been known in May, June, July, August, September, and October. The average rainfall is 28.5 inches. The greatest annual rainfall was in 1889-90, amounting to 45.85 inches; the least in 1850-1, 7.4 inches; the next lowest in 1897-8, 9.38 inches. There are on the average 70 days in the year on which some rain falls. Of the remaining 295 days, 175 are clear, 67 fair, and 53 cloudy without rain. The prevailing winds are from the southwest from April to September, and from the north and southeast in the other months. Southwest winds bring in fog from the ocean, and there are on the average about 66 foggy days each year.

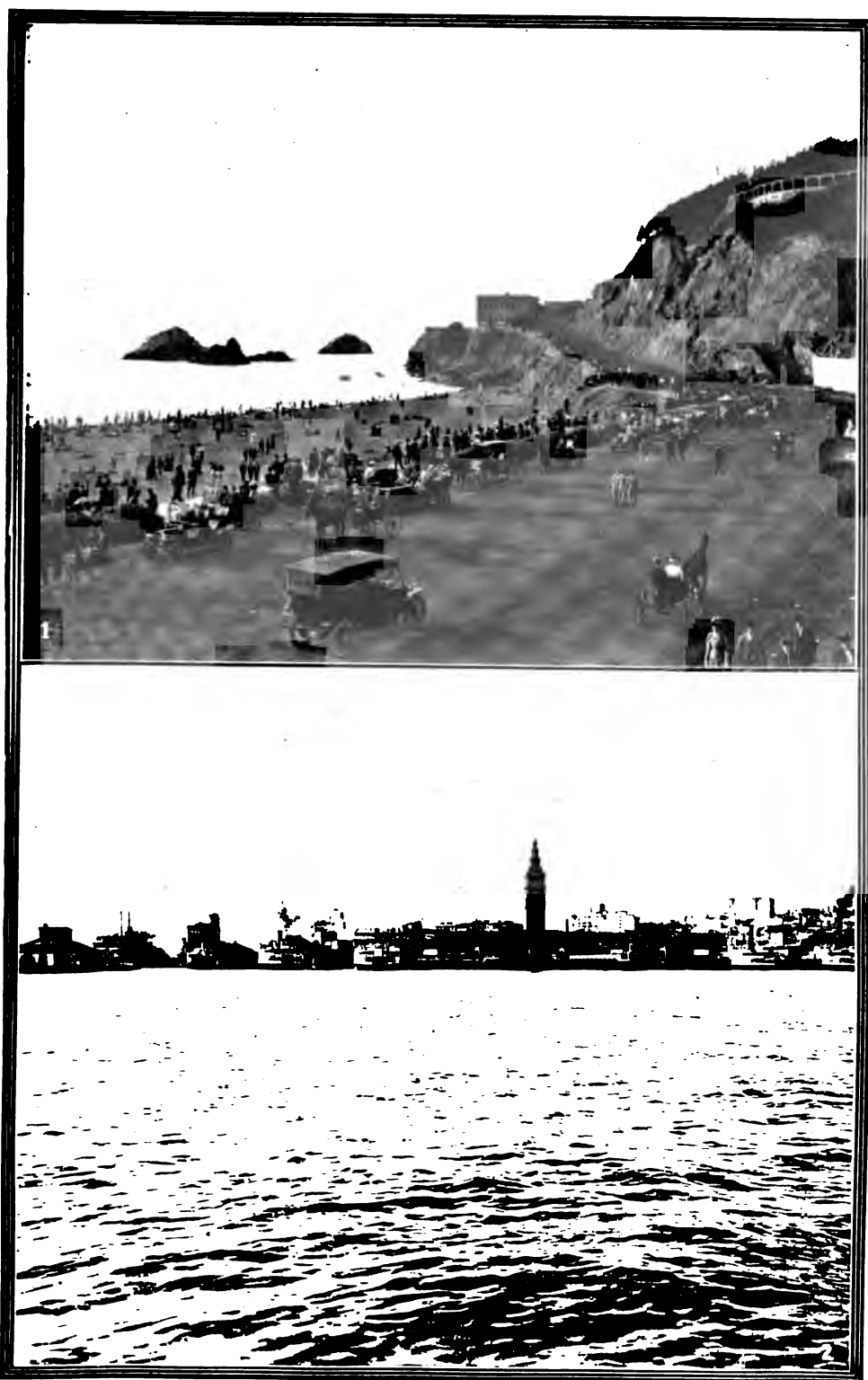
Municipal Government and Public Service.—San Francisco has a combined city and county government. Legislative power is vested in a board of 18 supervisors elected at large. A mayor, elected for two years, has the veto power, appoints the board of public works (three members), police commissioners (four), civil service commissioners (three), health board (five), board of education (four), fire commissioners (four), election commissioners (five), park commissioners (five). Appointments to the public service are made under civil service rules. The auditor, treasurer, assessor, tax-collector, coroner, and recorder are elected by the people, as is also the county clerk. The waterworks, the gas and electric systems, and the street railways are all in the hands of private corporations. The police department has 892 men, 10 stations, and costs \$1,329,000 per annum. The fire department has 724 men, 41 engines, 10 truck companies, and 11 chemical engines. It costs \$1,256,000 per annum. The school department employs 1,198 teachers, of whom 1,086 are women, and 112 men, has 85 day schools, 9 evening schools, with 50,212 pupils. The school fund amounts to \$1,577,000 per annum. There are also two richly endowed schools of technology; the departments of law, medicine, dentistry, pharmacy, veterinary science and art belonging to the University of

California are also in the city. On the island of Yerba Buena, within the city limits, is the naval training school of the United States government.

Public Buildings.—The Union Ferry Depot, where the boats land which connect San Francisco with the railway systems across the Bay, was erected by the State Harbor Commissioners in 1896, at a cost of over \$1,000,000. It is 659 feet long, 156 feet wide, contains the railroad ticket offices, waiting rooms, the California Development Board, and the State Mining Bureau. The United States Appraiser's Building is built of brick, four stories high, cost \$1,050,000, and contains internal revenue offices, secret service and marine offices, as well as the United States circuit and district courts, the court of appeals, and the offices of the appraiser, and the Coast and Geodetic Survey. The City Hall, an imposing structure, covering about four acres, and cost the municipal treasury \$6,000,000, was destroyed by fire in 1906, as were many fine theatres, hotels, and educational institutions. The United States mint ranks second in the country. It is kept constantly in operation coining the gold produced on the Pacific coast. In 1910 it coined \$42,565,000 in double eagles, \$8,110,000 in eagles, \$3,851,000 in half eagles, \$974,000 in half dollars, \$124,000 in dimes, and \$3,280,610 in pesos and centimes for the Philippine Islands. The public library has 117,000 volumes; it has 6 branches and 11 delivery stations. The people voted \$1,647,000 for land and building for a new library, and Andrew Carnegie has offered \$750,000 more, which has not been accepted. Some of the finest buildings of San Francisco were destroyed in the great fire of 1906, most of which have already been rebuilt. Among the important educational and scientific institutions may be mentioned the Hopkins Art Institute, the Memorial Museum, the Academy of Sciences, the Mechanics' Institute, the Sutro Library, the School of Mechanical Arts, the Cogswell Polytechnic Institute, and scores of theatres, hotels, etc. Before the fire the city had 36 public schools, including four secondary and 34 elementary schools, with an attendance of over 100,000.

Manufactures.—Until the recent discovery of crude petroleum in large quantities in California, San Francisco, in common with the rest of the State, suffered under a handicap in manufacturing on account of the lack of fuel. Most of the coal used in the city came from Puget Sound and British Columbia; some was brought even from Wales, Pennsylvania, and Australia. The difficulty is now removed, and oil at 75 cents per barrel, the prevailing price, is the equivalent of coal at \$3 per ton. There is, furthermore, little or no iron in California, and that raw material has to be imported also. Yet the iron industry thrives. The ability to compete successfully with other places more favored was advertised by the remarkable exploits of the United States battleship Oregon and the speed of the armored cruiser Wisconsin, both built in San Francisco. The foundation of the iron industry was originally the need for mining machinery, and the experienced gained in solving the problems which the construction of mining machinery in California presented stood this industry in good stead and prepared it to meet competition from outside. San

SAN FRANCISCO.



1. Seal Rocks and Cliff House.
2. San Francisco from the Bay.

SAN FRANCISCO.



SCENES FROM THE DESTRUCTION BY FIRE AND EARTHQUAKE APRIL 18, 1906.

1. Van Ness Avenue, looking south. St. Luke's Church on the left. Spreckels' residence on the right. At this point the fire was checked.
2. Showing immense steel girders twisted and torn out of all shape by fire. Twelve-story buildings occupied this site.

San Francisco now supplies mining machinery to meet demands from all parts of the world, from Alaska to South Africa. Like the iron industry, but with a less difficult handicap to overcome, the other manufacturing industries of San Francisco stand in close relation to the extractive and agricultural industries natural to the locality.

There are 1,795 manufacturing establishments in San Francisco, employing \$133,000,000 of capital, 6,116 salaried officials and 28,239 wage-earners. The material used cost \$76,175,000, and the products were worth \$132,929,000. Some of the industries having a product amounting to or exceeding \$10,000,000 are sugar and molasses refining. This is the largest single industry. San Francisco being the nearest port of entry for the raw sugar coming from the Hawaiian Islands much of it is refined here. Slaughtering and meat packing come next. This industry is supplied by the herds of cattle, flocks of sheep, and the hogs which are raised in the valleys and interior of California. Foundry and machine shop products represent the third industry in size. The Oregon, the Charleston, the Olympia, the San Francisco, the Monterey, the Ohio, the Wisconsin and other ships of the United States navy were built in the Union Iron Works. The canning of fruits and vegetables is another large industry employing several thousand persons during the season, and turning out a product worth over \$4,000,000. Leather working industries, including boots, shoes, gloves, saddlery, is important with a product of \$3,000,000. There is a considerable output of bakery products. Another industry of mark is the manufacture of pastry products, notably crackers and macaroni. Fish canning is not a large industry in San Francisco itself, but the great Alaskan fisheries and canneries are operated under the management of San Francisco houses, and stand to her industrial credit. They send into San Francisco upward of 2,000,000 cases of salmon alone each year, worth about \$6,000,000. The same is true of the manufacture of gunpowder, dynamite, and other explosives, which is carried on on a large scale from headquarters in San Francisco, although the factories are safely located among the hills across the Bay, where explosions can do little damage. The same is to be said of the Selby Smelting Works, where much of the product of California's mines is refined.

Population.—The population of San Francisco is very heterogeneous, nearly every European nationality — to say nothing of Mexico, China, Japan, Africa, and the Philippines being represented. In 1908 the estimated population of San Francisco was 480,000; in 1890, 298,997; in 1880, 233,959; in 1870, 149,473; and in 1860, 56,802. The census returns of 1850 were destroyed by fire before they became of record. In 1910 the city's population was 416,912. Of the total population in 1910 about 10,000 were Chinese and nearly 4,000 were Japanese. There were only about 1,500 negroes in the city. The greatest number of foreign-born came from Germany, 36,000. The city contains many Jews, some of whom are prominent in mercantile affairs. Of the total population less than 85,000 were of native parentage, about 260,000 being of foreign parentage, and of the native

whites less than 85,000, or about 4 per cent, were of native parentage. Only 3.1 per cent are illiterate.

Trade and Commerce.—Most of the foreign commerce of the United States on the Pacific passes through San Francisco. Much of that attributed to other ports terminates in San Francisco. A large part of the imports and exports of domestic produce from California and neighboring States and Territories also passes through the city, and much Californian and other Pacific coast produce is gathered at San Francisco and shipped out by rail. San Francisco has, in consequence, extensive wharves and warehouses, and a large coastwise trade. In 1910 San Francisco imported \$50,669,435 worth of goods from foreign countries by sea, and exported by sea to foreign countries and Atlantic seaports goods amounting to \$65,008,518. The principal countries to which San Francisco sent domestic exports in 1910 were Japan, \$8,709,031; England and Ireland, \$7,325,327; Philippine Islands, \$4,939,887; Australia and Oceania, \$2,210,517; Mexico and Central America, \$2,413,778. The total value of shipments of merchandise and produce to the Hawaiian Islands was \$14,921,461. The largest imports of foreign merchandise came from Japan, \$20,535,300; China, \$6,930,458; Mexico and Central America, \$3,359,292; Philippine Islands, \$2,715,710; Great Britain, \$1,946,182; British India, \$2,018,284. The total exports from San Francisco to all oriental countries in 1910 amounted to \$15,446,899; the imports to \$34,559,485. San Francisco also shipped away by sea \$9,557,967 in gold and silver each year, and half as much again by rail. The greater part of the treasure shipped away by sea goes to Hong Kong, Japan and India. If the treasure shipped is included, the total exports for 1910 amount to \$74,566,125. In many years San Francisco receives in treasure more than she sends away, most of it coming from Australia, as that country often pays for wheat she herself has bought or her creditor, England, has bought, by sending gold to San Francisco. The long distances from San Francisco to other great ports make it possible for the sailing ship to hold a large part of this trade. There were entered at the San Francisco Customs House in 1910 from foreign and Atlantic ports 182 sailing vessels with a total tonnage of 231,023 tons and 526 steamships with a total tonnage of 1,638,025 tons. The principal articles imported were wheat, 8,928,909 bushels, worth \$6,720,606; wheat flour, 872,941 barrels, worth \$3,159,543; barley, 6,379,540 bushels worth \$3,524,993. These shipments vary with the crop from year to year. It took 215 ships to carry away the grain. The annual pack of California canned fruits amounted to 3,240,000 cases of two-dozen two and a half pound tins, of which 793,072 cases went by sea; 40,458,900 pounds of dried fruits were also shipped by sea. San Francisco received 14,353,175 gallons of California wines and 503,599 of California brandies. Of wine exported 9,862,830 gallons went by sea. This was worth \$3,382,417, and most of it went to eastern ports of the United States. San Francisco always ships about 10,000 flasks of quicksilver each year. The principal imports are silk, sugar, tea and coffee.

SAN FRANCISCO — SAN JACINTO

Finance and Banking.—In 1910 the real and personal property of San Francisco was assessed for purposes of taxation at \$565,213,392, of which \$515,420,089 was land assessed at about 50 per cent of its true value; \$49,793,303, personal property, but the greater part of the personal property in the city was not assessed. The ratio of taxation is \$2.00 on each \$100 of assessed valuation, of which \$0.353 is for the State and \$1.647 for city and county purposes. The public debt in 1912 was \$19,838,100. Before the great fire of 1906 San Francisco had no debt. Her property was then assessed for taxable purposes at \$364,070,301, of which \$261,960,506 was land.

San Francisco Disaster.—On 18 April 1906 this city was visited by a severe earthquake, which, together with the great fire that followed, wrought terrible havoc in the western metropolis. Thousands of buildings, hundreds of lives, and half a billion dollars, were the losses sustained. Earthquakes were not unknown in the history of San Francisco—this city being in the earthquake zone—and several more or less violent disturbances have been experienced in recent times (in 1886, 1898, and 1900), but no such catastrophe as this of 1906 has ever been recorded. It was five o'clock in the morning, 18 April 1906, when that rude awakening was felt. The jar of violent impact, the crash of falling walls, the swaying of lofty buildings, the concussion of everything solid,—created such a tumult, witnesses say, as beggars description. The fire that broke out immediately, in twenty different places at once, prevented the firemen from fighting the flames—all watermains having been rendered useless by the contortions of the earthquake. For three days and nights the flames held complete sway over the city, when finally their progress was checked by the liberal use of dynamite and salt water pumped from the bay. The pecuniary loss was over \$500,000,000, and the insurance companies were staggered by the \$300,000,000 they were called upon to pay out—a number actually failing in the attempt. Relief funds amounting to over \$10,000,000 were collected in every American and many European cities, and reached the afflicted thousands in due time. Heroic measures were taken almost immediately to restore the city, and the courage and energy displayed by its inhabitants was the most remarkable thing in connection with this disaster. In less than a year after the flames were conquered, the city was already beginning to assume its normal aspect, and now the city looks more prosperous and beautiful than ever. The number of buildings destroyed in the fire was 28,188, valued at \$105,000,000. There have since (1912) been erected 30,316 buildings of nearly double the value of those they replace.

San Francisco 1915 Exposition.—In 1911, preparations were begun for celebrating the completion of the Panama Canal by a Universal Exposition. An Act of Congress was passed and approved by the President of the United States, selecting San Francisco as the site of the proposed exposition. Thirty, of the leading men who had been engaged in the rebuilding of San Francisco after the great fire

were chosen as Directors of the Exposition, under the Presidency of Charles C. Moore.

Bibliography.—Books on the early history of San Francisco: Dwinelle, 'The Colonial History of San Francisco'; Hittell, 'History of the city of San Francisco'; Soule, 'The Annals of San Francisco'; Moses, 'The Establishment of Municipal Government in San Francisco'; Royce, 'California'; Powell, 'Historic Towns of the Western States.'

BERNARD MOSES,
University of California.

San Francisco, a bay on the coast of California; a land-locked arm of the Pacific Ocean. The channel connecting the bay proper with the ocean is called the Golden Gate. The bay, including San Pablo at its northern point, is 55 miles long, and varies in width from 3 to 12 miles. It is the finest bay on the Pacific coast of the United States. There are a number of islands; Alcatraz, a fortified island, is four miles from the mouth; Angel, and Yerba Buena, or Goat Island, are the largest. San Pablo Bay, on the north, is nearly circular in form, about 10 miles across. The Straits of Carquinez connect Suisun Bay with San Pablo. Suisun Bay is about eight miles long and four miles wide. A number of other smaller bays furnish harbor advantages for several villages and towns. Nearly all the drainage of California enters the ocean through this bay. San Francisco (q.v.), Oakland (q.v.), and a number of smaller places are on its coast.

San Francisco Mountains, a group a little north of Central Arizona. They are on the Great Colorado Plateau, and are the highest mountains in Arizona. Challenger Peak is 12,794 feet and San Francisco Mount 12,562 feet above sea-level, or about 5,000 feet above the plateau. The group seems to have been formed by volcanic action and by circumdenudation. Lava is found on the summits and slopes of the peaks. From the summit of the San Francisco peak over 100 craters of extinct volcanoes are visible.

San German, san hēr-mān', Porto Rico, city, near the southwestern coast; 35 miles southwest of Arecibo. It was settled in 1511. It is in a fertile agricultural region, the prosperity of which has, however, declined. It is a picturesque town, with narrow old-fashioned streets; it contains several churches, a Dominican convent, hospitals and a seminary. An efficient public school system has been established under the American control, and a new graded school building built. Pop. city about 5,000; pop. municipal district, 25,000.

San Isidro, ē-sē-drō, Philippines, pueblo, capital of the province of Nueva Ecija, on the Grande de la Pampanga River. It is a well-built town, at the intersection of several main highways which connect it with Manila, with several points on the Manila & Dagupan Railroad, and with other important towns. It is in a fertile agricultural region and has a considerable trade. Pop. 9,480.

San Jacinto, sán 'ja-sín'tō, Battle of, in American history, a notable battle of the Mex-



Courtesy of Booklovers Magazine.

R. I. Aiken, Sculptor.

A SYMBOL OF AMERICAN MASTERY OF THE PACIFIC.

THE FIGURE OF VICTORY ON THE MONUMENT ERECTED IN SAN FRANCISCO TO COMMEMORATE THE BATTLE OF MANILA BAY.

SAN JOAQUIN — SAN JOSE

ican War that decided the independence of Texas. It was a desperate engagement between a Mexican force of 1,600 in command of Santa Anna, and 783 Texans led by Sam Houston, 21 April 1836. The Mexicans were defeated and utterly routed. The scene of this event was on the banks of the San Jacinto River, 17 miles southeast of the present city of Houston.

San Joaquin, *sān hō-ā-kēn'*, Philippines, pueblo, province of Iloilo, island of Panay; 31 miles southwest of Iloilo, the provincial capital. It is on the coast highway. Pop. 13,920.

San Joaquin, a river of California which has its rise in a small glacier southeast of the Yosemite Valley, near Mount Lyell, on the east slope of the Sierra Nevada. It flows southwest about 100 miles; then in Fresno County it changes its course to a northwest direction to its confluence with the Sacramento River, then flows west into Suisun Bay. In Fresno County it receives the waters of Tulare system of lakes through King's River, after which it passes through the Sanjon, or Big Salt, Slough. It is about 350 miles long, and is navigable for 50 miles to Stockton all the year, and in winter and spring about 200 miles farther. The valley through which the San Joaquin flows is noted for its fertility.

San José, *hō-sá'*, Cal., city, county-seat of Santa Clara County; on the Coyote and the Guadalupe rivers, and on the Southern Pacific railroad; 47 miles southeast of San Francisco, eight miles from San Francisco Bay, and 28 miles north by east of Santa Cruz. It is connected by railroad with Santa Clara and Monterey, both on the Pacific, and with San Francisco by three lines of railroad and by water.

The first settlement was made about 1770 and the pueblo of San José was established in 1782. It was the State capital under the first constitution of California. The completion of the overland railroad, in 1869, and the further development of transportation facilities, have aided greatly in promoting the prosperity of the city. The form of the city is that of a parallelogram; the streets are wide, well shaded, and clean. The four public parks, the excellent roads extending out into the valley, the equable climate, all contribute toward making San José a desirable residential city. It is situated in a fertile agricultural region, the beautiful Santa Clara Valley, famed for the variety and amount of its fruit. There are large canneries, packing-houses, and shipping establishments connected with the fruit industry, also flour mills, grain elevators, lumber mills, woolen factories, basket and box factories, a foundry, machine shops, yards for marble-cutting and granite polishing, tanneries, and several other industrial establishments. The annual output of the farm and fruit products is valued at \$6,500,000.

The principal public buildings are the government building, which cost \$200,000; the city-hall, in the Plaza; the court-house and Hall of Records, opposite Saint James Park; the Y. M. C. A. building, the churches, schools, and charitable institutions. There are 32 churches, representing 12 different denominations; five religious societies not having churches, and several missions, among which are the Florence Night Mission and Christ's Rescue Mission.

The educational institutions are the State Normal School, in Washington Square, a park of 28 acres; the University of the Pacific (M. E.); Notre Dame College (R. C.), for young women; Academy of Notre Dame (M. E.); Notre Dame College (R. C.), for boys; Notre Dame Institute (R. C.), a training and technical school for orphans; a public high school, six public kindergartens, public and parish elementary schools, two commercial colleges, four private schools, and a public library.

The charitable institutions are, the Pratt Home for Old Ladies, the O'Connor Sanatorium, the San José Sanatorium and Home, Josephinum Orphanage, and the Home of Benevolence, maintained by the Ladies' Benevolent Association. Numerous medicinal mineral springs are in Alum Rock Park, several miles east of the city; area, 400 acres.

The annual amount expended for municipal maintenance and operation is about \$280,000. In 1900 the national bank had a capital of \$300,000, and the six state banks a combined capital of \$1,590,000. Pop. (1890) 18,060; (1900) 21,500; (1910) 28,946.

San José, Costa Rica, capital of the republic, on an elevated plateau 3,868 feet above sea-level, about 15 miles northwest of Cartago (the ancient capital), with which it is connected by rail. It is in a rich agricultural district, and is a centre of commerce, on the international railway from Puerto Limón to Punta Arenas. The most conspicuous buildings are the palaces of the president, and the bishop, and the National Palace; the University, to which is attached a medical school and a museum; the restored cathedral, and the National Theatre, a monument of artistic beauty, containing Italian marbles, pillars, columns, statues, and frescoes, and in its elaborate decorations resembling the Library of Congress at Washington. It cost almost \$1,000,000. There is a good school system and the city is progressive. The merchants are mostly foreigners. The railroads, banks, and electric-light plants were largely built by English capital. The French are the chief coffee-growers; the United States are mainly interested in the railroads, mines, cattle ranches, and the banana industry. Coffee is the principal product. San José is becoming a health resort for Isthmian workers.

San José, Guatemala, the chief port of the republic, on the Pacific Ocean. It is the starting point for the railroad trains to the capital, and a steamer station. The exports are cochineal, indigo, sarsaparilla, wood, flax, coffee, sugar, cotton, hides, and rubber. Pop. 1,500.

San José, Philippines, pueblo, province of Batangas, Luzon; on the Malaquintubig River, 10 miles north of Batangas, the provincial capital. It is on the main highway, and on the line of a projected railroad, and is a military and telegraph station. Pop. 10,000.

There are also several smaller pueblos of this name: (1) pueblo, province of Bulacán, Luzon; destroyed by the Spaniards in the insurrection; pop. 2,397; (2) pueblo, province of Ambos Camarines, Luzon, on the main highway, eight miles southeast of Nueva Cáceres; (3) pueblo, island of Corregidor, 27 miles

SAN JOSÉ — SAN JUAN HILL

southwest of Manila; chief town of the island with good anchorage; pop. 574; (4) pueblo, de Pampanga River, 11 miles northeast of San province of Nueva Ecija, Luzon, on the Grande Isidro; a road centre; pop. 852.

San José de Buenavista, dā bwā-nā-vēs'tā, Philippines, pueblo, capital of the province of Antique, Panay; on the west coast. The town has a good harbor, carries on an active trade by sea with Iloilo, and is connected by highway with the other towns of the province. Pop. 5,621.

San José de Cucuta, dā koo'koo-tā. See CUCUTA.

San José de Lagonoy, dā lā-gō-noi', pueblo, province of Ambos Camarines, Luzon; 22 miles northeast of Nueva Cáceres. It is the most important town of the sub-district of Lagonoy, which is largely isolated from the rest of the province. Pop. 9,000.

San José Scale. See SCALE INSECTS; ORANGE PESTS.

San Juan, hoo-ān', or **San Juan de la Frontera**, dā lā frōn-tā'rā, Argentina, (1) capital of the province of the same name, east of the River San Juan, on the eastern slope of the lower Cordilleras, north of Mendoza. It is the see of a bishop. The principal buildings are the bank, national college, normal school, large seminary, hospital, and custom house. There is some export trade in wine and cattle. Pop. (1901) 11,000. (2) The province covers an area of 33,715 square miles. On the west the Cordilleras are interspersed with fertile valleys, on the east are found salt steppes or pampas. In the Andes lofty peaks rise to the height of 5,580 (Cerro Gordo) to 6,798 (Meredario) metres. East of the Rio Jachal are high mountains, then follows the chain of the Sierra Huerta. The principal streams are Rio Vermegio and Rio Sanjon: on the southern frontier extends the large lake of Guanacache. Gold and copper mines are operated. The climate is mild, and the country well watered. Grapes, olives, and wheat are extensively cultivated. Pop. about 95,000.

San Juan, Philippines, pueblo, province of Unión, Luzon; on the west coast, four miles north of San Fernando. It is on the main highway. Pop. 10,211. There is also a smaller pueblo of the same name in the province of Bohol. Pop. 5,428.

San Juan, or **San Juan de Porto Rico**, Porto Rico, city, capital of the island; built on a small island adjacent to the northeastern coast, connected with the mainland by a bridge. It was founded in 1511 by Ponce de Leon, and was strongly fortified. It was attacked by the Dutch in 1625 and on several occasions by the English, the last time in 1797, when a large force under Abercrombie laid siege to the city; its fortifications, however, rendered it impregnable. In 1808 it was occupied by American troops, and remains the seat of government for the island under American rule. The main part of the town is enclosed by mediæval ramparts and defended by Morro Castle, at the entrance of the harbor, forts Sant Elena and San German, and the citadel of San Cristobal. Within the walls the city is laid out in regular squares; the houses are substantially built and the streets

well paved. Sanitation was neglected under Spanish rule, but after the American occupation the best sanitary measures were strictly enforced, and the general health of the city greatly improved. It contains a number of notable public buildings, including the bishop's palace, a large cathedral, the old government building, the city hall, the casa blanca, the custom house, a military hospital, an arsenal, and a theatre. It has a trolley car system which connects it with the pretty suburban towns, Santurce and Rio Piedras. The harbor is one of the best in the West Indies, affording anchorage for the largest ships. The entrance, however, is very narrow and difficult for navigation. The public school system of graded schools includes a high school, which is open to pupils from all parts of the island. There are also several special schools established by the government, including night schools, an industrial school, an experimental kindergarten, and a school for trained nurses. Pop. (1899) 32,048; (1900) 48,716.

M. OLMEDO,

Secretary Porto Rico Board of Trade.

San Juan, a range of mountains in the southern part of Colorado, one of the Rocky Mountain chains. Some of the peaks are over 14,000 feet in height.

San Juan, a river of Argentina, in the province of San Juan, which has its source in the Andes, is joined by the Mendoza, Diamante and Atuel, and flows into the Colorado, by which it reaches the ocean south of Bahía Blanca. It is about 250 miles long.

San Juan, Rio, Central America, a river forming the outlet of Lake Nicaragua, and flowing southeastward on the boundary between Nicaragua and Costa Rica into the Caribbean Sea. Part of it would have formed a link in the interoceanic waterway if the Nicaragua Canal had been decided on. It is 130 miles long, and for the greater part of its course is a broad, deep and tranquil stream. It is, however, completely blocked at five places by rapids, of which the Machuca Rapids are the largest. The river enters the sea through a large delta, one arm of which forms the harbor of Greytown, though the bar is too shallow for large vessels.

San Juan, or **Haro Archipelago**, Northwest America, a group of islands, lying between Vancouver Island and the mainland of the State of Washington, U. S., which cover an area of 300 square miles. Their possession was in dispute between England and the United States, as the Oregon Boundary Question of 15 June 1846, contained an ambiguous meaning. The matter was settled (1872) in favor of the United States by the decision of Wilhelm I. of Germany.

San Juan Islands, a group belonging to the State of Washington. They begin in the Strait of Georgia and extend south into Puget Sound. The largest islands of the group are San Juan, Orcas, Lopez, and Shaw. In 1859 these islands were claimed by both the United States and Great Britain, and both American and British garrisons were on the islands. See SAN JUAN QUESTION.

San Juan Hill, Battle of. See SANTIAGO DE CUBA.

SAN JUAN QUESTION—SAN LUIS POTOSI

San Juan Question, in American history, an early boundary line dispute between the United States and Great Britain. In negotiating the treaty of 1846, by which the 49th parallel, from the Rocky Mountains to the sea, was made the boundary, a controversy arose concerning the course of the line through the channel which divides Vancouver Island from the mainland. The Americans contended for the Canal de Haro, the British for the Rosario Strait. To avoid conflict, it was decided that both nations occupy the island of San Juan at opposite ends. In 1872 the German emperor, acting as arbitrator, decided for America.

San Juan Bautista, bow-tēs'tā, Mexico, the capital of the state of Tabasco, situated on the Rio Grijalva near the centre of the state. It is built on low and level ground, has street-car lines and several pretentious buildings, such as the government palace, a theatre, and several churches. It is the trade depot for the interior of Tabasco and northern Chiapas. Pop. about 10,000.

San Juan de Bocboc, dā bōk-bōk', Philippines, pueblo, province of Batangas, Luzon; on Tayabas Bay at the mouth of the Sinturis (or Lanay) River. There are two towns, the old town built directly on the bay, the new town further inland on the river. Many horses are raised in the surrounding region. Pop. 14,017.

San Juan del Mezquital, dēl mās-kē-tāl', Mexico, a town in the northwestern part of the state of Zacatecas.

San Juan de Nicaragua, dā nē-kā-rā'gwā. See GREYTOWN.

San Juan del Norte, dēl nōr'tā, or **San Juan de Nicaragua**. See GREYTOWN.

San Juan del Rio, dēl rē'ō, Mexico, a town in the state of Querétaro, situated about 30 miles southeast of Querétaro. It is surrounded by beautiful gardens, and there are important silver mines in the neighborhood.

San Juan del Sur, dēl soor, Nicaragua, a port on the Pacific coast in the southwestern corner of the republic. It has a safe harbor and is the commercial outlet for the products of southwestern Nicaragua. It has submarine cable connection with Mexico and Panama, and is a station for regular steamers. The terminus of the proposed Nicaragua Canal would have come a little to the north of the town.

San Juan de Ulúa, dā oo-loo'ā, or **Ulloa**, Mexico, a fort defense in the harbor of Vera Cruz, standing upon a small island of its own name. Here Cortes made his first landing in 1519. The fort was built in the 17th century and was of great strength. It has figured conspicuously in the history of Mexico.

San Lucar de Barrameda, loo'kār dā bār-rā-mā'thā, Spain, a seaport, province of Cadiz, Andalusia, at the mouth of the Guadalquivir, 18 miles north of Cadiz. The most conspicuous buildings are: several convents and the palace of the Duchess of Montpensier, containing valuable art treasures; the ruins of a Moorish castle; churches; townhouse and an English hospital, which dates from 1517. There are good schools directed by religious orders generally. The chief occupations of the inhabitants are fishing and the culture of grapes, olives, tropical

fruits and vegetables, and there is considerable trade in sherry wines. The chief imports are coal from England; sulphur and vegetables from France; exports, salt, wine, fruit, and oats. Columbus embarked from this point on his third voyage, and Magellan on his voyage of 1519. Pop. about 25,000.

San Luis, loo-ēs', or **San Luis de la Punta**, Argentina, (1) Capital of the province of that name, at the southern extremity of the Sierra of San Luis, on the Chorillo, 480 miles northwest of Buenos Ayres on the transcontinental railway. It has a national college, primary schools and a branch bank; also water supply. The chief industries are the manufacture of *ponchos*, and trade in horses, hides and wool. It was founded in 1597, consists of adobe huts, and is surrounded by forests of ferns. Pop. (est.) 10,000. (2) The province is situated in the central west of the republic, with an area of 28,535 square miles. At the northeast terminates the Sierra de Cordoba; through the northeast extends the Sierra de San Luis rich in copper and precious metals, which are, however, little exploited. In the south extend salty pampas. The climate is dry and healthful, marked by great extremes. The rivers are not navigable; transportation facilities are poor, and there is little industry. Pop. about 95,000.

San Luis Obispo, ō-bēs'pō, Cal., city, county-seat of San Luis Obispo County; on the Southern Pacific railroad; about nine miles from Port Harford on San Luis Obispo Bay, an arm of the Pacific Ocean, and about 200 miles south by east of San Francisco. It is in an agricultural and stock-raising region. The industries are connected chiefly with the farm and dairy products and the cultivation and shipping of fruit. The educational institutions are a high school, Immaculate Heart of Mary Academy, public and parish schools. The five state banks have a combined capital of \$720,000. Pop. (1910) 5,157.

San Luis Potosi, pō-tō-sē', Mexico, an inland state. See MEXICO—THE STATES OF.

San Luis Potosi, Mexico, capital of the state of San Luis Potosi and fourth largest city in the Republic; 326 miles from Mexico City by the National railway, 477 miles from the United States border at Laredo, Texas, and 275 miles from the Gulf of Mexico at Tampico by the Mexican Central railway; altitude 6,250 feet above the sea. It is the center of an important mineral and smelting interest, extensive ore deposits existing in almost every direction, and is the home of the greatest silver-lead reduction works in the world,—the smelting plant of the Compania Metalurgica Mexicana, with a capacity of 1,000 tons daily, and requiring the services of 1,400 men, in all departments. In 1904 this smelter reduced 214,207 tons of minerals, producing 167,823 kilograms of silver, 1,352 of gold, 16,167 of lead and 3,558 of silver. As a distributing and general business center it is regarded as one of the most important and promising in the Republic. The opening of the port of Tampico has proven very beneficial to its commercial interests. Its manufacturing industries include clothing, furniture, cotton goods, tallow, and other articles of commercial importance. It has a street railway,

SAN MARCOS—SAN NICOLAS

telephone service, and an excellent electric lighting system. The governor's palace of rose colored stone is an imposing building, and the Cathedral is one of the notable ones of the country. A University—The Instituto Científico—in which the professions and exact sciences are taught, is the principal educational institution of the city. There are also a scientific museum, with a library of over 15,000 volumes, and five other libraries, with a total of some 10,000 volumes. A fine statue of the patriot Hidalgo, occupies a prominent place in the Alameda or principal public square. This city is the seat of one of the most important Catholic Archbishopsrics in the republic. The only local bank of issue is the Bank of San Luis Potosi, with a capital of \$1,100,000; but there are branches or agencies of the National Bank and the London and Mexico Bank, both of Mexico City. The city was founded about 1550 and has played an important part in the Mexican civil wars; in 1863 was the seat of government under Juarez; later was occupied by Bazaine and recovered by Juarez in 1867. Pop. about 75,000.

San Marcos, mār'kōs, Texas, town, county-seat of Hays County; on the San Marcos River, and on the International & G. N., and the Missouri K. & T. R.R.'s; 30 miles southwest of Austin. It became the county-seat on the organization of the county in 1848. It is in an agricultural region, cotton and corn being the chief products; stock-raising is also carried on in the vicinity. The town contains steam cotton-gins, and cottonseed-oil mills, also a United States fish culture station. There are two national banks with a combined capital of \$130,000. A group of boiling springs is located within the town limits. It has a public high school, established in 1891; and contains the grounds of the Texas Chautauqua Association. It is also the seat of the Coronal Institute, a secondary school established by the Methodist Episcopal Church South in 1879, and of the Lone Star Business School. Pop. (1890) 2,330; (1900) 2,292; (1910) 4,071.

San Marino, mā-rē'nō, Europe, the smallest republic in the world, comprises an area of 38 square miles, enclosed by Italian territory, among the terminating spurs of the Apennines near the Adriatic coast. The government is peculiar and eminently democratic; the legislature is elected from the ranks of nobles, citizens and peasants. The executive is always of a dual nature, chosen every six months. The town, standing on a mountainous crag 2,200 feet high, was built round a hermitage dating from 441, and is surrounded by a great wall with forts. But one road enters the town. Borgo is an aristocratic suburb at the foot of the hill. Silk is the principal manufacture. There are numerous massive and stately buildings including the governor's palace, and churches, besides several schools, a museum, theatre, town-hall and convents. Agriculture is the chief pursuit. The city counts about 2,000 inhabitants. The state, about 11,000.

San Marino, Order of. See ORDERS, ROYAL.

San Martin, José de, hō-sā' dā sán mār-tēn', South American general: b. Yapeyu, Argentina, 25 Feb. 1778; d. Boulogne, France, 17 Aug. 1850. He was educated in Spain and entered the army in 1791. In 1811 he attained

the rank of lieutenant-colonel, but resigned and sailed for Buenos Ayres in 1812, where he offered his services in the cause of independence. He defeated the viceroy Vigodet on 13 Jan. 1813 at San Lorenzo, and the next year, being appointed commander-in-chief of the army of Upper Peru, prepared to attack the Spanish forces by an approach through Chile. An army of invasion was drilled for two years at Mendoza, whence San Martin began 17 Jan. 1817, his famous march over the Andes, leading his army through the Uspallata Pass. On 12 Feb. 1817, he gained the victory of Chacabuco, and captured and occupied Santiago 15 February. He was defeated on 19 March 1818 at Cancha Rayada, but repulsed the royalists on 5 April at the Maipo, and drove the Spaniards from Chile. He next invaded Peru, and captured and occupied Lima, 12 July 1821. On 27 July he proclaimed the independence of Peru and on 3 August was appointed protector. He resigned his office to the Peruvian Congress, 22 August, leaving Bolivar to complete the independence of Peru. He then went to France and lived there till his death.

San Miguel, sán mē-gēl', Salvador, the capital of a department of the same name on the Rio Grande, nine miles east of the active volcano of Saint Miguel (7,775 feet), and 70 miles southeast of San Salvador. It is an active commercial and agricultural centre, noted for its great annual fair. Indigo is an important article of commerce. The climate is malarious. Pop. about 26,000.

San Miguel de Allende, dā āl-yēn'dā, Mexico, a manufacturing city in the state of Guanajuato, on the Rio de la Lara, and on the Mexican National Railroad, 34 miles north of Ceyala. Woolens, saddles and weapons are the chief articles produced. Pop. 39,000.

San Miguel de Mayo, dā mā-yoo'mō, Philippines, pueblo, province of Bulacán, Luzón; on the San Miguel River; 26 miles north of Bulacán. It is on the main highway at the junction of several others; and the river is navigable for native craft. It is the commercial centre of a fertile agricultural region; excellent timber is obtained on the surrounding mountains and iron is mined at Sibul, eight miles distant. The climate is especially healthful, and there are medicinal springs in the vicinity of the iron mines. The town suffered considerable damage during the insurrection on account of its proximity to insurgents' hiding places in the mountains. Pop. 20,460.

San Miniato, mē-nē-ā'tō, Italy, in the province of Florence, 21 miles west of the city of Florence, on the Arno. The ancient cathedral dates from the 10th century and is adorned with many interesting monuments. Glass, olive oil, hats and leather are manufactured. The town has considerable historical interest, especially as being the cradle of the Napoleon family. Pop. 8,000.

San Nicolas, ne-kō-lās', Philippines, (1) Former pueblo of the province of Cebu, incorporated as a part of the municipality of Cebu, the provincial capital in 1901. Pop. 17,800. (2) Pueblo, province of Ilocos Norte, on the Laoag River; three miles south of Laoag. It is on the coast highway. Pop. 9,578. (3) Pueblo, prov-

face of Pangasinán, near the Agno River; 34 miles east of Lingayén. It is connected with Lingayén and also with towns to the south by highway. Pop. 10,204.

San Nicolas, or **San Nicolas de los Arroyos**, *dā lōs ār-rō'yōs*, Argentina, a town in the province of Buenos Ayres, situated at the head of the delta of the Paraná, some distance below Rosario. It is an important railroad centre and a station for ocean steamers. It has electric light and street railways, large beef-packing houses, flour-mills and distilleries. The chief exports are wool and cattle products. Pop. of commune about 23,000.

San Pablo, *pā'blō*, Philippines, pueblo, province of Laguna, Luzon; 17 miles south by west of Santa Cruz. It is on the main road from Santa Cruz to Tayabas, at the junction of other highways. It is the centre of an area of volcanic elevations, with five small mountain lakes in the vicinity. There are indications of valuable mineral deposits. Pop. 19,540.

San Pablo Bay. See **SAN FRANCISCO BAY**.

San Pedro, *pē'drō*, city annexed to Los Angeles, 1909; on San Pedro Bay, an inlet of the Pacific Ocean, and on the San Pedro, L. A. & S. L., and the Southern P. R.R.'s; about 25 miles south of Los Angeles. The harbor, enlarged and otherwise improved by the government, is one of the good harbors of the Pacific coast. The breakwater, 8,000 feet long, cost over \$3,000,000. The harbor improvements completed in 1904, has a clear depth of 30 feet, permitting the largest vessels to enter the inner harbor. San Pedro is in an agricultural region and near sections in which there is considerable mining. Its chief industries are connected with exporting grain, fruit, and minerals. Pop. about 14,000 before annexation.

San Pedro, Paraguay, a town situated on a branch of the Paraguay River, about 100 miles north of Asunción. It is accessible for small steamers, and exports maté. Pop. about 6,000.

San Pio Quinto, *pē'ō kēn'tō*, a port on the western coast of Camiguin Island, north of Luzon, extending two miles inland, and three miles wide. It is sheltered by Font Island lying in the middle of the entrance with a channel on each side. Near the entrance to the south is a boiling spring of salt water; a stream of fresh water enters this harbor. It is one of the principal cruising stations of the United States navy in the waters of the northern Philippines.

San Rafael, *rā-fā-ēl'*, Cal., town, county-seat of Marin County; on San Pablo Strait, and on the North Pacific Coast and the San Francisco & North Pacific R.R.'s; 15 miles north of San Francisco. It is the centre of a stock-raising dairying, and agricultural region; and has frequent communication with San Francisco both by railroad and ferry. It is situated near Mount Tamalpais and is a well known health resort. It contains Saint Vincent's Male Orphan Asylum. It has a public high school, with a library of about 1,800 volumes (1904); and is the seat of San Rafael Institute, the Dominican College (for girls), a Roman Catholic secondary institution, the Hitchcock Military Academy, and the Mount Tamalpais Military Academy. Pop. (1910) 5,934.

San Remo, *rā'mō*, Italy, in the province of Porto Maurizio, seaport, 30 miles northeast of Nice, on the Mediterranean, in the famous Riviera district, and a much frequented health and pleasure resort. The town is terraced, the ancient upper town with narrow and crooked streets lined with lofty buildings forming a strong contrast to the modern edifices of the lower town.

San Sebastian, *sā-bās-tē-ān'*, Spain, capital of the province of Guipuzcoa on the Bay of Biscay, 42 miles northwest of Pampeluna, is a port, and a natural and fortified stronghold. It has been the summer resort of the Cortes since 1886. The principal buildings are the churches of San Maria and San Vicente, a nunnery, the court-house, the schools of navigation, commerce, etc., theatre and hospitals. In the environs, on the Bay of La Concha, is the royal palace. The industries of the town have greatly developed, and include saw and flour mills, breweries, manufactures of preserves, soap, candles, glass, and paper, and there is considerable trade in English and French goods. Corn and other articles are exported. San Sebastian is an aristocratic watering place, bathing, bull-fights, gambling, and local festivities attracting many visitors. Historically it has played an important role, and has sustained several sieges, the most memorable in 1813, when Wellington took it by storm. Pop. about 40,000.

San Stefano, *stēf'a-nō*, **Treaty of**, a peace treaty of the Russo-Turkish war; concluded 3 March 1878, at San Stefano, a port on the Sea of Marmora. By its terms Bulgaria was to become a principality, extending from the Danube to the Ægean, and Rumania, Servia, and Montenegro were recognized as independent. Russia was to receive a war indemnity of 300,000,000 rubles, and the Dobrudja, Kars, Batum, and other possessions. The congress held at Berlin, in June and July, 1878, greatly altered the provisions of this treaty, effecting peace on somewhat more moderate terms.

San Vicente, *vē-sān'tā*, or **San Vicente de Austria**, Salvador, 40 miles northeast of the capital, lies almost central in the Republic close to an extinct volcano of its own name. It is an attractive town; its handsome church is the only conspicuous building. It occupies a fertile region and the chief occupations are tobacco and indigo planting; and the manufacture of the former. The annual fair is much frequented. The town suffered from an earthquake in 1899. Pop. about 19,000.

Sanaa, *sā-nā'*, or **Sana**, Arabia, the capital of Yemen, lies in a high and well-watered valley, 260 miles north of Aden and 140 miles northeast of Hodeida on the Red Sea. It is of great antiquity, massively built and surrounded by a wall. Each street is arranged with reference to business confined to that locality, according to Asiatic custom. The principal mosque is of recent construction, an oriental building with fine domes and minarets. The chief manufactures are gold and silver articles, gunpowder, sword-blades, etc. Trade is in coffee—the great staple—dried fruit and raisins. Sanaa was long the capital of the independent Imams of Yemen, but in 1872 came under Turkish rule, since when

SANATORIUM — SANCTI SPIRITUS

its commercial importance has declined. Pop. 45,000, of whom about 20,000 are Jews.

Sanato'rium, a place or building to which people resort for the sake of their health, the term being specifically applied to military or civil stations on the mountains or table-lands of tropical countries, with climates suited to the health of Europeans. Recently a movement has been set on foot for the equipment of open-air sanatoria for consumptive patients.

Sanborn, sän'börn, Alvan Francis, American journalist: b. Marlborough, Mass., 8 July 1866. He was graduated from Amherst in 1887 and has filled several journalistic positions, among them that of Paris correspondent of the *Boston Evening Transcript* 1899-1902. He has published 'Moody's Lodging House and Other Tenement Sketches' (1895); 'Meg McIntyre's Raffle and Other Stories' (1896); 'Paris and the Social Revolution' (1903).

Sanborn, Franklin Benjamin, American philanthropist and author: b. Hampton Falls, N. H., 15 Dec. 1831. He was graduated from Harvard in 1855, became active in politics as a member of the Free Soil party in New Hampshire and Massachusetts, was for a time secretary to the Massachusetts State Kansas committee, and aided John Brown in the invasion of Harper's Ferry after having vainly opposed the scheme. From 1863 to 1868 he was editor of the *Boston Commonwealth*; in October 1863 became secretary of the Massachusetts State board of charities, the first established in America; and in 1865 assisted in the organization of the American Social Science Association, of which he was until 1897 secretary. With Bronson Alcott (q.v.) and W. T. Harris (q.v.) he founded the Concord school of philosophy in 1879; and he was also an organizer of the National prison association (1871), and the National conference of charities. Among his publications are: 'Life and Letters of John Brown' (1885); biographies of Thoreau (1882), Alcott (1883), and Dr. Howe (1891); 'The Personality of Thoreau' (1902); and 'The Personality of Emerson' (1903).

Sanborn, John Benjamin, American military officer: b. Epsom, N. H., 5 Dec. 1826. He was educated at Dartmouth College, studied law, was admitted to the bar in 1854, and in that year removed to Saint Paul, Minn., where he engaged in law practice. At the outbreak of the Civil War in 1861 he was adjutant-general and quartermaster-general of Minnesota and assisted in the organization of the troops sent to the front. In 1862 he went to the front with the rank of colonel. He commanded a brigade at Iuka, was engaged at Corinth, Port Gibson, Raymond, Jackson, Champion Hills, and at the siege and assault of Vicksburg. He had been commissioned brigadier-general of volunteers in 1863, and in October 1864 took command of the district of southwest Missouri. He bore the unique record of never having been defeated in action and with the exception of the assault of Vicksburg, never failed of complete success. He conducted a campaign against the Indians in 1865, amicably adjusted the Indian difficulties the next year, and in 1867-8 was a member of the Indian Peace Commission. He served in the Minnesota legislature for several terms.

Sanborn, Katherine Abbott ("KATE SANBORN"), American author and lecturer: b. Hanover, N. H., 11 July 1839. She earned her first money by writing, at the age of 11, and at 17 engaged in teaching. She lectured on literary topics for 20 years, was teacher of elocution at Packer Institute, Brooklyn, and for several years occupied the chair of English literature at Smith College. She has published: 'Home Pictures of English Poets' (1869); 'Round Table Series of Literature Lessons' (1884); 'The Vanity and Insanity of Genius' (1885); 'Adopting an Abandoned Farm'; etc.

San'cho, an instrument of the guitar species, made of hollowed wood and furnished with a long neck. It is strung with the tough fibres of a creeping plant, and is tuned by means of sliding rings.

Sancho Panza, sän'kō pän'za (Sp. sän'chō pän'tha), the faithful squire of Don Quixote (q.v.), who accompanies his master upon his travels, but who takes a prosaic view of the incidents colored and distorted by his master's illusions. He is famous for his shrewd proverbs.

Sanchuniathon, sän-kū-ni'a-thōn, or Sanchoniathon, alleged author of a history of Phœnicia and Egypt, entitled 'Phoinikika,' and published by Philo (q.v.) of Byblus, a grammarian of the 2d century, as a Greek translation from the Phœnician. According to Philo, Sanchuniathon was a native of Berytus, a Phœnician town near his own native place, and flourished during the reign of the Assyrian queen Semiramis. Others speak of him as a Phœnician living before the Trojan war. Some critics maintain that no such person ever existed, and that the work attributed to him was the composition of Philo himself, or, as others think, of Eusebius. A fragment of the work is preserved in Eusebius, who quoted Sanchuniathon as evidence in corroboration of certain biblical statements which Porphyry had assailed. The Greek fragments still extant were published by Orelli (1826) and by C. Müller (1849), and were the occasion of much keen controversy. The conclusion arrived at by Renan is that a Phœnician of the time of the Seleucides, whose real or feigned name was Sanchionathon, wrote in Phœnician, a work on history and mythology, and that a free translation of this was afterward made by Philo of Byblus.

Sancroft, säng'kröft, William, English prelate: b. Fressingfield, Suffolk, 30 Jan. 1617; d. there 24 Nov. 1693. He was graduated from Cambridge in 1637, was appointed dean of York in 1664, took orders in the English Church, and shortly afterward became dean of Saint Paul's Cathedral. In 1678 he was consecrated archbishop of Canterbury, but in 1688 on refusing to publish the declaration of the liberty of conscience ordered by James II., was committed to the Tower for trial. He was acquitted, but after the Revolution refused to take the oath of allegiance to William and Mary, was deprived of his see, thereafter living in seclusion in his native town until his death.

Sancti Spiritus, sänk'tē spē'rē-toos, Cuba, city, province of Santa Clara, 50 miles south-east of the city of Santa Clara. It was founded in 1514, being one of the seven original towns of the island established by Diego Velasquez. It

SANCTIFICATION — SAND

is connected by a branch road with Las Tunas, on the south coast, and with the main railroad system of the island; but has little commercial importance. Its situation is unhealthy; its streets are narrow and crooked, but were improved somewhat during American occupation of Cuba, nine streets being completely re-made. It contains two hospitals and a college. Pop. about 15,000.

Sanctification, a theological term in the definition of which divines Protestant and Catholic differ widely. For the former, sanctification is totally distinct and separable from justification: for Catholic theologians, sanctification and justification are inseparable and hardly even in thought distinguishable one from the other. Calvin (Inst. Book 3, ch. ii.) the Lutheran symbol 'Solida Declaratio' (ch. *de fide justif.* §7), and Luther and Melancthon in many places, teach that justification is simply a judicial act of God's free grace liberating the sinner from *condemnation*, while original sin still persists in man's nature and in all his powers inward and outward, to be weakened, not extirpated, by the communication of the Holy Spirit: thus sanctification is a process which begins after justification. Justification in the teaching of the Catholic Church is defined by the Council of Trent (Sess. 6, ch. vii.) to be "not only remission of sins but also *sanctification* and renovation of the inner man through the free acceptance of grace and gifts"; and in another place (Sess. 6, ch. v.) the Council teaches that "justification is a transference out of that state in which man is born a son of Adam, into the state of grace and adoption of the children of God, by the Second Adam, Jesus Christ, our Saviour." From which it appears that in Catholic theology sanctification is inseparable from justification, which depends upon it; and that "the sinner is justified and sanctified by the one same act"; *uno eodemque actu homo peccator justus sanctusque efficitur* (Perrone, 'Praelect Theol.' tr. *de Gratia*, Pt. 2, ch. i.).

Sanctuary, Privilege of, the exemption of certain places and of criminals taking refuge in them from the ordinary operation of the law of arrest: called also privilege of asylum (q.v.). The six cities of refuge mentioned in the Book of Numbers xxxv., were to afford the privilege of sanctuary to "any one that killeth any person unawares." That institution in Israel and the institution of asylum among the heathen nations gave rise to the similar institution of sanctuary in Christendom. The privilege of sanctuary was accorded to certain churches in the time of Constantine; afterward, through the period of the empire, eastern and western, and throughout the Middle Ages, it was recognized as attaching to all churches. In England a person accused of felony might take refuge in a sanctuary, and then before the coroner, within 40 days, take oath of abjuration entailing perpetual banishment into a foreign Christian country. Statutes of the time of Henry VIII. greatly curtailed the privilege of sanctuary, and the statute of 21 James I. totally abolished it. But the privilege of sanctuary against civil process still persisted, attaching to certain places, parts or supposed parts of royal palaces, as Whitefriars ("Alsatia"), the Savoy, and the Mint: these were secure refuges for debtors till 1697,

when their privilege was abolished by the statute 8 and 9 William III. All religious sanctuaries in Scotland were done away at the Reformation; but the Abbey and Palace of Holy Rood with its precincts, including the hill of Arthur's Seat and the Queen's Park still afforded protection against civil process for debt; and the privilege still exists in form, though in fact it never has to be invoked since the abolition in 1880 of imprisonment for debt.

Sanctus, or **Tersanctus**, a passage in the liturgical service of the Catholic Church, eastern and western, and in part still retained in the Anglican Book of Common Prayer: it is the final passage of that part of the liturgy (and of the Anglican communion service) which is called the Preface. The name Sanctus or Tersanctus (thrice holy) is given to it because of the word sanctus (holy) thrice repeated, with which it opens: *Sanctus, sanctus, sanctus, Dominus Deus Sabaoth*, etc., that is, "Holy, holy, holy, Lord God of Hosts, heaven and earth are full of Thy glory. Hosanna in the highest. Blessed he that cometh in the name of the Lord. Hosanna in the highest." In the prayer book only the first clause is used, followed by "Glory be to Thee, O Lord Most High. Amen."

Sand, sând (Fr. sând), **George**, assumed name of Amantine Lucile Aurore Dupin, French author: b. Paris 5 July 1804; d. Nohant, Berri, 7 June 1876. Until 14 she was brought up at the Château of Nohant near La Châtre (department of Indre), mostly under the care of her grandmother, a great admirer of Rousseau and Voltaire, who was at constant feud with her mother about her upbringing. In these circumstances she grew up somewhat wild, and it was agreed to send her to a convent. The English Augustine convent in Paris was selected, and here she remained from 1817 to 1820. In 1822 her parents obliged her to marry M. Dudevant, son of an officer and baron of the empire. Mme. Dudevant's married life proved unhappy, and in 1831 she left Nohant for Paris with L. S. J. Sandeau, a young lawyer. She obtained her livelihood at first by painting fancy articles such as cigar-cases, but began to work at literature in collaboration with Sandeau. After some minor productions in the 'Figaro,' she and Sandeau brought out in the 'Revue de Paris' a novel called the 'Prima Donna' and another 'Rose et Blanche.' These works were published under the pseudonym, formed by abbreviation, of Jules Sand. They excited little attention, but the genius of Mme. Dudevant had been recognized by Henri Delatouche, under whose patronage her first independent novel, 'Indiana,' appeared (1832), and who suggested the pseudonym George Sand. 'Indiana' had a brilliant success, but excited much criticism by its extreme views on social questions.

This was also the case with many others of her works: 'Valentine,' 'Lélia,' 'Jacques,' 'André,' 'Leone Leoni,' 'Simon,' 'Mauprat,' 'La Dernière Aldini,' 'Lavinia,' 'Metella,' and others, appeared within the first few years after her début. She visited Italy with Alfred de Musset (q.v.); and lived eight years with Frédéric François Chopin (q.v.), the composer. These relations also influenced or occasioned some of her works (as 'Elle et Lui,' 1858). In 1836 she obtained a judicial separation from her

SAND — SAND-DARTER

husband, with the care of her children. She took an active interest in the revolution of 1848, and contributed considerably to newspaper and other political literature.

Her works no longer occupy the place they once did. The style is neutral, not careless, but also with no distinction. There is little originality, and small analysis. Despite Dowden's protest, the process was evidently more or less of a mechanical one, composing from 10 to 5 daily in business-like fashion; beginning with no idea of a plot and no character study; evolving things as the pen hurried along. In this manner books were made with the regularity of the rotation of crops. In smallest compass as published by Lévy of Paris, they fill 120 volumes. Small wonder that the author in a few years read them as if they were the works of others. They have, it is true, imagination; but it does not vitalize; it makes literature of a sort, but not literature which, like that of the great names, stands a second perusal. Perhaps the author is at her best in descriptions of French landscape. English critics apparently attacked her work from the first, for we find a National Reviewer using of 'Lélia' the words "incoherent," "foolish," "useless." But while this exaggeration has been tempered by a juster appreciation, it is true that the great body of such an output, its declamation, its doctrinaire views, its lack of harmony, have been found tedious despite the style. Consult the biography by Caro (1887) and Thomas.

Sand, a mass of unconsolidated mineral grains of practically uniform size, large enough to be detected with the unaided eye, but too small for the grains to be readily picked up by hand. In composition sand varies greatly, from grains of pure silica or pure calcium carbonate to a complex mixture of many minerals. Pure silicious sand is in most cases primarily derived from the disintegration of igneous or other rocks, containing silica, which remains behind after the removal of other minerals more subject to chemical disintegration. The separation is usually accomplished by the waves of the seashore, and in general it may be said that the longer the sands are subject to wave activity, the more complete will be the sorting process. Calcareous sands result mostly from the grinding up by the waves of shells, corals, etc., or of limestone beds; and may be of all degrees of purity. On the shore, the sands are kept firm by the water held between the grains by capillary attraction. If this evaporates, the sands are driven inland by the winds, piled up into sand-dunes, and often convert extensive districts into sand-deserts. (See DESERT.) River sands derived from crystalline or metamorphic rocks often carry gold or other precious metals in the forms of grains or nuggets. Sands washed by temporary streams from glaciers or glacial moraines and deposited in front of the ice, build up sand-plains, which are the chief source of sands and gravels in glaciated regions. See GLACIAL DEPOSITS.

Sand-badger, or **Hog-badger**, a small East Indian badger (*Arctonyx collaris*), which gets its first name from its customary station and burrowing habits, and the second from its pig-like rooting snout. Another frequently heard name is "balisaur." It frequents stony ground and occupies natural crevices and dens

when these are handy, but elsewhere digs rapidly and deeply burrows in which it spends its days for the most part, waiting until night to go abroad in search of its small prey. Its general habits are like those of its type. See BADGER.

Sand-blast, an invention for the use of sand as a blast in cutting and engraving glass, stone, metals, etc. The sand is blown against the article to be cut by a blast of air or steam, which quickly cuts away the unprotected surface, leaving in relief that part of the surface guarded from the effect of the sand by patterns of iron or other substance harder than that which it is desired to efface. The sand-blast attracted much attention when first introduced, and it has been used largely in the preparation of soldiers' tombstones, and other large contracts of a similar character.

Sand-bur, either of two very dissimilar plants. One, also called the buffalo-bur (*Solanum rostratum*), is a weed, native to the western plains of the United States; it is the original food of the potato-bug, and is working eastward, its seeds having traveled at first, perhaps, in the coats of the bison. It has even crossed to Europe, by some means. The sand-bur is an annual, densely pubescent, and prickly-armed plant, having the characteristic star-shaped flowers of the potato, although yellow in hue. The calyx is densely prickly, and surrounds the berry in fruit, the prickles becoming as long as the berry itself. Sand-bur seeds occur among fodder-seeds grown in the West, but careful cultivation will subdue this weed. The plant is light and bushy, and is blown over the prairies as a tumble weed.

A grass (*Enchurus tribuloides*) is also called "sand-bur," and is commonly found near seashores or in waste land, in the eastern half of the United States, where it is becoming a noxious weed in some places. It has robust stems, partly decumbent from an annual root, and branches freely. The leaves are flat, and the floral involucre are crowded in terminal spikes on a rough stem, and form spiny burs, which stick easily to clothing or the hair of animals, and so may be carried long distances.

Sand-cake, or **Sand-dollar**, a name along the New England coast for one of the flat, dollar-shaped, villose sea-urchins of the genus *Echinarachnius*; several species are to be found on sandy bottom near shore, and others are numerous in greater depths, affording some food to cod, flounders and other bottom-feeding fishes. See CAKE-URCHIN.

Sand-crack, a crack or fissure in the hoof of a horse, due to a disease generally referred to the coronet, sometimes to the laminae covering the pedal bone, specifically to the membrane which secretes an essential adhesive substance entering into the constitution of the hoof. The crack generally extends from the coronet toward the sole. In the fore feet the inner quarters are most frequently attacked; in the hind feet, the toes. There are various forms of sand-crack, the most common of them being usually called quarter-crack. See HOOF.

Sand-darter, a genus (*Ammocrypta*) of small fresh-water fishes (see DARTER), whose species, especially *A. pellucida*, common in the mid-continent streams, buries itself in the sandy

SAND-GROUSE—SAND WHEEL

bottom with astonishing quickness and completeness.

Sand-grouse, a family (*Pteroclidæ*) of birds related, on the one hand, to the pigeons (*Columbæ*), and, on the other, to the grouse (*Gallinæ*). The sand-grouse inhabit the plains and sandy deserts of the tropical regions and countries of the eastern hemisphere. The legs are longer than in grouse, the tail and wings pointed and the general aspect dove-like. The best-known species are the *Pterocles alchata* and the *P. arenaria*. Both of these birds occur in southern Europe. They fly well, and feed upon seeds and insects. The eggs are four or five in number, and the nest is constructed in a rough fashion on the ground. Other species inhabit Asia and Africa. Pallas' sand-grouse has been made the type of a different genus, *Syrnaptus*, in which the tarsi are feathered and the anterior toes united in a common integument, as well as feathered to the claws, the hallux absent. It is a native of the plains of Central Asia, where it occurs in vast numbers. Much interest was excited in 1863, and again in 1888, by great numbers of these birds invading Europe. They crossed the North Sea and were found in considerable numbers throughout Britain, and as far north as the Faroes. They even bred in Great Britain in one or two cases. Smaller invasions occurred in other years. Sand-grouse are classed as game-birds in the regions in which they occur and especially in India.

Sand-hill crane. See CRANE.

Sand-hopper. See AMPHIPODA.

Sand-launce, or **Sand-eel**, a small teleost fish of the family *Ammodytida*, which is represented on all the colder coasts of the world by some ten species, but whose relationships are undetermined. They have the shape of eels, from 6 to 12 inches long, according to species, but are distinguished by the fact that the tail-fin is well developed, and is distinct from the dorsal and anal fins, while it is also forked at its extremity. The skin is silvery in appearance, but destitute of true scales. The lateral line runs along the side of the back. The dorsal fin begins just behind the head, and extends nearly to the caudal fin. The anal fin extends to about one third or one half the length of the body. Several species are to be found on both coasts of North America.

Sand-Martin. See BANK-SWALLOW.

Sand, Musical. See MUSICAL SAND.

Sand-paper, an abrading agent made by coating paper or thin cotton cloth with glue and dusting fine sand over it with a sieve. Sand-paper is intermediate between glass paper and emery paper in its action on metals, but is less energetic than glass paper in its action on wood.

Sand-pike, a fish, the sauger (q.v.).

Sand Pipe, cylindrical hollows, often of great depth, and filled with sand and gravel. They are characteristic of all rocks, but have been particularly described from the white chalk of England and France, where Lyell has found them up to 12 feet in diameter and over 60 feet deep. They are analogous to pot-holes formed along mountain streams through the gyrating motion of the water in an eddy. The

holes are cut by loose rocks kept in constant circular motion by the water. Analogous hollows, termed glacial pot-holes or moulins, are also formed where a superglacial or englacial stream plunges down a crevasse and sets the rocks at the bottom of the crevasse in motion, thus often cutting to great depths. These holes, or pipes, are afterward filled with sand and gravel either by the stream or upon the melting of the ice. These holes have also been attributed by Lyell to the chemical action of water charged with carbonic acid gas, which was derived from the decaying vegetation of the soil through which the water passed.

Similar deposits of sand, generally solidified into sandstones or quartzites, are not infrequently found in the older rocks of all countries. These are generally masses in the form of dikes penetrating sedimentary or crystalline rocks, often to a great depth. Many of these sandstone dikes were formed at a very early period in the earth's history, when the fissures were formed either through solution, atmospheric disintegration, or in some cases through earthquake shocks.

Sand-shark, a small voracious shark of the family *Carchariidæ*, which is mainly extinct, the three existing species occurring chiefly in the Atlantic, where *Carcharias littoralis* (J. & E.) occurs numerously on the American coast between Cape Cod and Cape Hatteras; it is doubtfully different from the one frequently seen along the European coast. These sharks are similar to the mackerel sharks (*Lanuridæ*), and reach a length of five or six feet.

Sand-sucker, a local name in California for a familiar fish, the whiting (q.v.).

Sand-wasp, any of many solitary wasps which burrow in sand or loose earth, and leave their eggs there in well-provisioned cells. There are numerous species in all parts of the world. See WASP.

Sand Wheel. The removal of fine waste, sand and slime, from mills where ores are crushed and concentrated, may call for the use of special devices, one of which is the sand wheel. If the mill stands on a hillside such refuse can usually be washed down troughs, called launders, to lower ground where it may accumulate. If the mill site is level land, and the mill handles a large amount of rock, then the refuse must be lifted that it may flow to a settling place. Various types of elevators and conveyors are used for this purpose. The sand wheel, though bulky, has the merits of simplicity and few wearing parts, and is simply a development of the water wheels used since ancient times for irrigation purposes in eastern countries. At ore mills in many parts of the world sand wheels may be seen, notably at the great gold mines of the Transvaal, where are some over 50 feet in diameter.

A giant sand wheel, one of the largest ever erected, now handles the mingled sand and water from the great crushing and concentrating plant of the Calumet & Hecla Mining Company, at Lake Linden, Mich. This mill treats an enormous tonnage of copper-bearing rock and the resulting waste is run into the lake, where the accumulations of years now cover many acres. That the waste might be lifted higher to flow over the old deposits the new wheel was erected.

SANDAL — SANDARACH

It is 65 feet in diameter, elevates the water and waste to a height of 50 feet, and has a capacity of 75,000,000 gallons in 24 hours.

It was constructed by the Robert Poole & Son Company, of Baltimore, Md. In the general principles of design involved the wheel does not differ materially from other segmental iron and steel wheels of large diameter, but is of interest from its size. The axle, a hollow cylinder made of Krupp's crucible cast steel, was forged at Essen, Germany, but finished at Baltimore; it is 27 feet long, 32 inches in diameter at the middle and has a 16-inch hole through the centre. This axle weighs 42,000 pounds.

The axle journals are 25 inches in diameter and 42 inches long. Fitted to either end of the axle is a massive gun-iron hub, weighing 20,000 pounds, and from these hubs radiate 40 four-inch steel rods, or spokes to the inner face of the rim. The inner end of each spoke is fitted with a thread, nut and lock-nut by which the requisite tension is given for securing and truing the rim. The outer end of each rod is turned into an eye, and fastened to a steel flange on the rim by an eye-bolt. The rim is built up in 20 segments. It consists of two concentric rings, an inner, or main, ring of box-shaped cross section to which the spokes are attached, and an outer, or toothed ring fastened through inwardly projecting flanges to the inner rim by bolts and keys. On the periphery of this outer rim are gear teeth, accurately milled in two rows, staggered. Each row of teeth is 12 inches wide, making the effective width 24 inches. And there are 26 teeth in each segment or 520 in all.

To each side of the sectional rim is rivetted a triangular plate iron box, carrying on its inner side 275 buckets, making 550 in all, each bucket measuring 4 feet, 3½ inches, by 3 feet, 4 inches. The wheel makes about 4 revolutions per minute and the peripheral speed of the buckets is about 12 feet per second, but the buckets are set at such an angle that the peripheral speed prevents their discharge till they are near the top of the wheel. The tangential strains due to the loads of sand in the buckets, are taken up by a system of tangent tie-rods which extend from the lugs, already referred to, on the rim, to the periphery of a tangent hub which is keyed to the centre of the axle, between the two outer hubs. These tie-rods are arranged in pairs and in opposite directions so that, although the load at the periphery may exert either a right-handed or a left-handed strain, no transverse bending strain is brought upon the main spokes of the wheel. The tension of the tangential tie-rods is adjusted by means of turnbuckles placed at the centre of each rod. The wheel, with buckets attached, is nearly 12 feet wide across the face. It is driven by an electric motor of 750 horsepower through a pinion wheel 37 inches in diameter having a shaft carrying a wheel that engages a pinion on the motor shaft. The wheel dips into a pit 100 feet long, 12 feet wide and 30 feet deep that receives the sand and water. From this pit the refuse is scooped up and discharged into a launder at an elevation of about 50 feet. For protection against the elements, the winter climate being severe, the wheel is housed in a building high enough to cover it entirely.

S. SANFORD,
Engineering & Mining Journal.

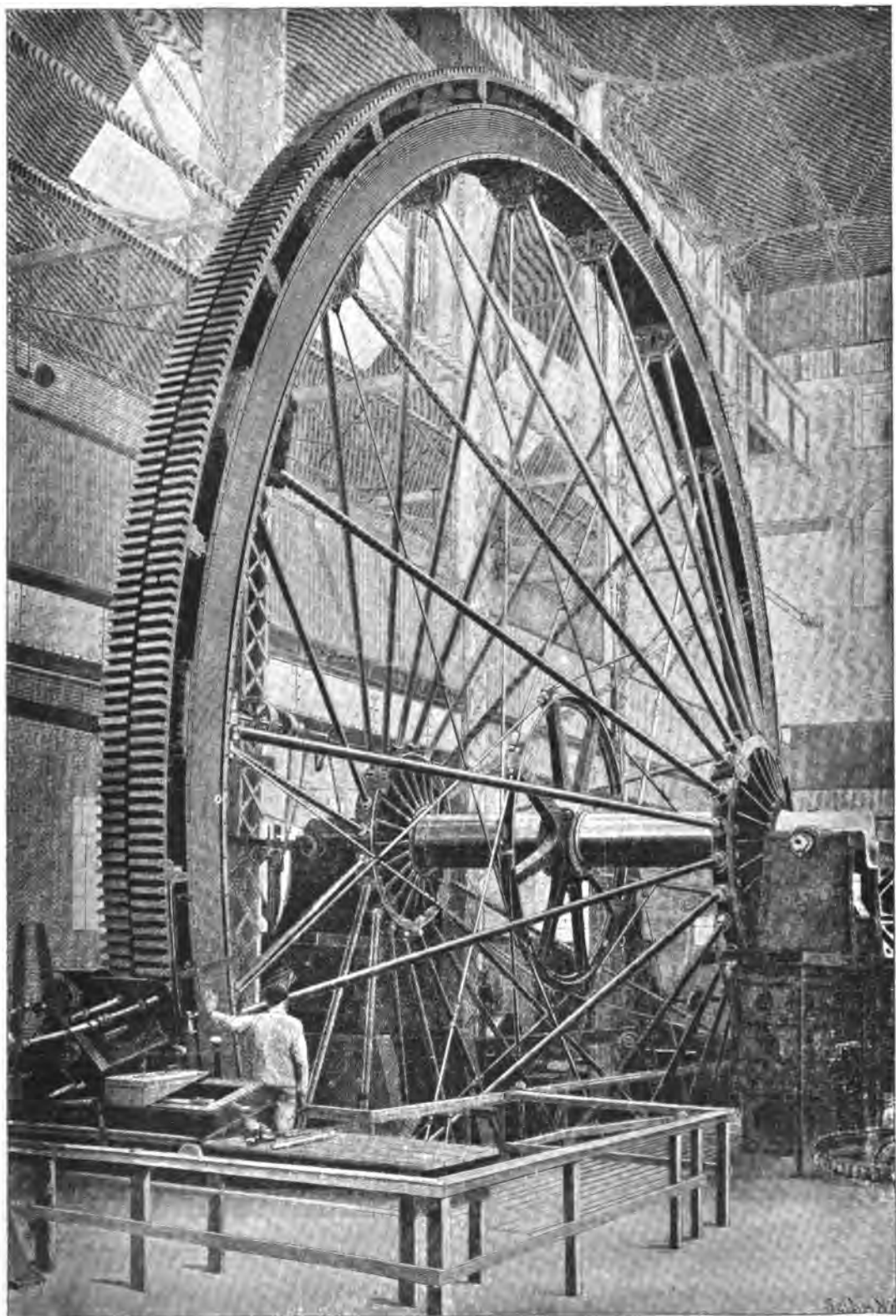
Sandal, a kind of covering for the feet used among the ancient Jews, Greeks, and Romans, and which we find to be of the highest antiquity. It usually consisted of leather, or of a thick cork sole covered above and beneath with leather and neatly stitched on the edge. It left the upper part of the foot bare, and was fastened on by means of straps, crossed over and wound round the ankle. In later times sandals became articles of much luxury, being made of gold, silver, or other precious material, and beautifully ornamented. See **BOOTS AND SHOES**.

Sandal-wood, a fragrant wood furnished by the genera *Santalum* and *Fusanus*, of the *Santalaceae*. The principal source of the genuine sandal-wood is a small evergreen tree (*Santalum album*), partly parasitic in growth, with opposite entire leaves, and thyrses of yellowish flowers which resemble those of the privet. It grows wild, and is now also cultivated, in the dry regions of southern India, and on the mountains of the Malay Archipelago.

The trees are mature in about 20 years and are then cut down, the trunk being then about a foot in diameter. The felled trunks are left on the ground in order that the white ants may eat off the useless sap-wood, the insects leaving the aromatic heart wood untouched. When thus cleaned the sandal-wood is sawn into small pieces, and then dried slowly to improve the fragrance and to prevent splitting. This heart wood is yellowish-brown, very hard and close-grained and made odorous by the presence of an oil, which is still more abundant in the root. The oil is distilled from the roots and chips, and is largely used as a perfume, especially in India, and also as a medicine; it is said to have replaced copaiba in the treatment of diseases of the mucous membrane. The heart wood is used especially by the Chinese for carvings, fans, boxes, etc., not only because of its lasting perfume, but because it repels insects; it was employed in India during the 5th century at least, and is still a necessary article in various Buddhistic ceremonies, in cremations, for caste marks, and for incense. It was probably one of the ingredients of the Levitical incense and the almug of Scripture. Sandal-wood was originally obtained only in India, but other species (*S. freycinetianum* and *S. pyrularium*) were found in Hawaii; and in other Pacific islands, and led to a trade so high-handed that many deaths ensued, and the supply of trees was nearly exhausted.

Another small leguminous tree (*Pterocarpus santalinus*) furnishes the red sandal- or sanders-wood, having a heart wood, first dark-red, but becoming brownish on exposure, and used as a dyestuff, giving reddish-brown hues to woollens. Powdered, it was employed to color foods, and was considered by Hindu physicians to be astringent and tonic. Various inferior qualities of sandal-wood are obtained from *Bucida capitata*, the *Myoborinea* and other trees.

San'darach, a friable, dry, almost transparent resin, which is imported from Morocco, in pale yellow tears, somewhat harder than mastic. It exudes from the bark of the small coniferous sandarach-tree, also called the tear tree (*Callitris quadrivalvis*), a native of the north of Africa, and a characteristic tree of the Atlas



GIANT SAND WHEEL FOR THE CALUMET AND HECLA MINING COMPANY.
Diameter, 65 Feet: Weight, 50 Tons: Number of Buckets, 550

SANDAY — SANDERS' RAID INTO EAST TENNESSEE

Mountains. The Australian species of *Callitris* furnish a similar resin. Sandarach is not used in great quantity. Although a medicine in high repute at one time, and later used for a pounce-powder, to prevent ink from spreading when writing over an erasure, its chief employment now is in the making of varnishes, the same as mastic. The mahogany-colored wood of the sandarach tree is highly balsamic, extremely durable, and is utilized by cabinet-makers and mosque-builders; it is said to have brought fabulous prices in Pliny's time.

San'day, William, English biblical scholar: b. Holme-Pierrepont, Nottinghamshire, 1 Aug. 1843. He was educated at Oxford, took orders in the Anglican Church, and has been Lady Margaret professor of divinity and canon of Christ Church, Oxford, from 1895. He is the author of: 'The Authorship and Historical Characters of the Fourth Gospel' (1872); 'The Gospels in the 2d Century' (1876); 'Inspiration' (1893-6); 'The Catholic Movement and the Archbishops' Decision' (1899), etc.

Sand'bags, in fortification and other military operations, are coarse canvas bags, about 30 inches long and 15 inches thick, filled with sand, and much used in cases where cover for troops is required to be speedily obtained.

Sand'by, Paul, English painter: b. Nottingham 1725; d. London 9 Nov. 1809. He was one of the earliest painters in water colors in England, and has been styled "the father of the water color school," but began life as a teacher of boys and only resolved on an artistic career after his appointment to the staff of the military drawing department of the Tower of London (1741). In 1747 he was draughtsman for the government survey of the Highlands of Scotland, which gave him a good opportunity for sketching the scenery. In 1752 he made 70 drawings of Windsor Castle and Eton, and afterward accompanied Sir Joseph Banks on a tour of Wales. In 1768 he was appointed drawing-master at Woolwich Academy, and became one of the most fashionable art teachers of his day. His 'Views of the Encampment in the Parks' (1780) illustrate his style. He outlined his subjects with a pen, and then washed them in with colors in a very simple and direct way. His best works are those in body colors, which are tinted with richness, depth, and refinement, and are not conventionalized by the bold pen outline. As a caricaturist, he is known by his ridicule of Hogarth's 'Line of Beauty,' and his caricature portraits, such as those of 'Lords North and Thurlow.' He was a member of the Incorporated Society of Artists, and one of the original members of the Royal Academy, founded 1768.

Sandeau, Léonard Sylvain Jules, lă-ô-năr sêl-vân zhûl sâh-dô, French dramatist: b. Aubusson, Creuse, 19 Feb. 1811; d. Paris 24 April 1883. He came to Paris in 1831 in company with George Sand, and for two years they lived and worked together, contributing to 'Figaro' and collaborating on a novel 'Rose et Blanche' (1831) published as the work of "Jules Sand." The intimacy was ended in 1833 when he made a visit to Italy. He returned to Paris the next year, however, and resumed his literary career. He became librarian of the Mazaria

Library in 1853 and curator in 1859, having the year previously been elected to the French Academy. He was joint author with Augier of 'Mlle. de la Seiglière' and 'Le Gendre de Monsieur Poirier.'

Sandeman, sän'de-man, Robert, Scottish religious leader: b. Perth, Scotland, 1723; d. Danbury, Conn., 1771. He studied at Edinburgh, and afterward engaged in the linen trade. On marrying the daughter of the Rev. John Glass (founder of the Glassites), he adopted his pastor's views in opposition to all church establishments and became an elder in his congregation. He soon after published a series of letters, in which he endeavors to show that a justifying faith means nothing more than a simple assent to the divine mission of Christ. Sandeman went to London in 1760 and managed to gather together a congregation of his own followers, who were called Sandemanians. The Glassites or Sandemanians number at present less than 2,000 throughout the world. In 1764 Sandeman accepted an invitation to New England, and became the author of some theological tracts, letters, discourses, etc., besides his 'Letters on Theron and Aspasio.' The Sandemanians revived the love-feast (to take place in each other's houses); the kiss of peace; the support of the poor members by the community; washing each other's feet; community of goods; they maintained the unlawfulness of saving money; etc. They still have a slender following at Danbury, Conn. The most noted personage professing the Sandemanian faith was the great scientist, Michael Faraday (q.v.), who lived and died in that communion.

Sandema'nians. See SANDEMAN, ROBERT; RELIGIOUS SECTS.

San'derling, a sandpiper (*Calidris arenaria*), peculiar in lacking the hind toe. This bird averages 7 to 8 inches in length, and is colored in winter, gray on the upper, and white on the under parts; the spring plumage differs in exhibiting reddish tints, marked with black. It is nearly cosmopolitan, breeding in the Arctic regions of both hemispheres, and migrating to the southern parts of South America and Africa, though many winter in the southern States. The food consists of worms, crustacea, etc. These birds chiefly inhabit the sandy tracts of the sea-beach, and the estuaries of rivers, but are common about large bodies of water in the interior also, and associate with other species. The flesh is nutritious and pleasant to the taste, and the bird is a favorite with gunners in quest of shore-birds.

Sanders, sän'dêrz, Frank Knight, American Biblical scholar: b. Batticotta, Jaffna, Ceylon, 5 June 1861. He was graduated from Ripon College, Wis., in 1882, was instructor at Jaffna College 1882-6, and studied Semitic languages at Yale 1886-7. He was Woolsey professor of biblical literature at Yale 1893-1901, and since the last named year has held the chair of biblical history and archaeology at the Yale Divinity School. He has published with C. F. Kent 'The Messages of the Earlier Prophets' (1898); 'The Messages of the Later Prophets' (1899).

Sanders' Raid into East Tennessee. On 14 June 1863 Col. W. P. Sanders, with 1,500 mounted men and two guns, left Mount Vernon,

Ky., to destroy the East Tennessee & Virginia Railroad. Crossing the Cumberland River he surprised a body of 400 Confederates at Montgomery, Tenn., on the 17th, capturing 105 officers and men and a large amount of supplies. Avoiding the Confederates at points on the way, he struck the railroad at Lenoirs on the morning of the 19th, captured three guns and about 65 prisoners, burned the depot and other buildings, containing five guns, 2,500 stand of small arms and ammunition, and then destroyed the railroad to within a short distance of Knoxville. Leaving a regiment south of the city to demonstrate on it, Sanders, with the rest of the command, passed around the place during the night, struck the railroad north of it, burned the bridges, and on the morning of the 20th made a strong demonstration on Knoxville by the Tazewell road. Artillery-firing and skirmishing continued an hour, during which Sanders captured two guns, 30 prisoners, and some horses, and then followed the railroad to Strawberry Plains, destroying all bridges, including one over the Holston 1,600 feet long, near which, after a sharp engagement with the bridge-guard, he took 140 prisoners, five guns, and a train of cars loaded with supplies. At daylight 21 June he started up the railroad for the Mossy Creek bridge, destroying the road at several points, and also the bridge. Large quantities of stores and 120 prisoners were captured. He now left the railroad to return by Rogers' Gap, avoiding forces sent to intercept him. The gap was found blocked by fallen timber and guarded by infantry and artillery, and adjoining gaps were found similarly obstructed. With the enemy in his front and closing on his rear, he found but one way to escape, and that by a trail impassable for artillery. He abandoned his guns, after destroying them and their ammunition, and by a wood road moved through Smith's Gap, three miles from Rogers', driving a cavalry regiment from it, and after a hard march in the Cumberland Mountains, in which some of his men took wrong roads, he reached Boston, Ky., on the 23d with a loss during his raid of two killed, four wounded, and 13 missing. He had captured 10 guns and 10,000 small arms and paroled 461 prisoners. Consult: 'Official Records,' Vol. XXIII.

E. A. CARMAN.

Sander'son, Sibyl, American opera singer: b. Sacramento, Cal., 1865; d. Paris, France, 16 May 1903. She studied music in Paris and made her debut at The Hague in 1888 in Massenet's 'Manon.' The composer then wrote for her 'Esclarmonde,' which she sang in Paris. She also appeared in 'Le Mage,' 'Thais,' in the 'Lakme' of Delibes, and in 1894 sang the part of the heroine in Gounod's 'Romeo et Juliette' at the Grand Opera. She appeared in New York in 1895 and in 1901, but without any great success. Though she sang in various cities of Europe her greatest successes were won at Paris.

San'dersville, Georgia, city, capital of Washington County, on the South Carolina & Georgia Railroad; 120 miles northwest of Savannah. It is situated between the Oconee and Ogeechee rivers, in a fertile cotton region, and has a considerable export trade in cotton. It has a high school for colored pupils established in 1890. Pop. (1910) 2,641.

Sand'ford and Merton, *The History of*, a famous book intended for juvenile reading, by Thomas Day, published 1783-9. Portraying English social ideas of more than 100 years ago, it can hardly be regarded at the present time, as other than a literary curiosity. It is named for two school boys whose adventures are related in the most priggish fashion. Morals are tediously drawn from every incident of their daily lives, and from the stories which they read in their lesson books. Not the least remarkable feature of the book is the polished language used by these children of six years of age.

Sandham, sãnd'ãm, Henry, American artist: b. Montreal, P. Q., 24 May 1842. He engaged in business until 1881, though he had studied and practised art from an early period. After that date he visited England and France for further study, and finally settled in Boston. He is a painter of portraits, landscape and genre, and has given much attention to illustration. He was made a member of the Royal Canadian Academy in 1880. His 'Dawn of Liberty' (1886) hangs in the Lexington, Mass., town hall.

Sandhurst, sãnd'hêrst, England, in Berkshire, about five miles southeast of Wokingham, is notable for the Royal Military College, established here in 1812. Students enter by competitive examination. The course extends over one and one half years and comprises all subjects relating to military tactics, law, history and geography, gymnastics, etc. At its completion the cadets enter the infantry or cavalry with the rank of second lieutenant. Pop. about 3,300.

Sand'pipers, small limicoline birds of the family *Scolopacida*, but not clearly distinguished, either in ornithology or in common practice, from the snipes (q.v.), although attempts have been made to erect them into one or more sub-families, *Tringina*, etc. Most of the group collect about the typical genus *Tringa*, and as a whole the sandpipers may be said to be intermediate between the snipes and the plovers. The bill is snipe-like in its form and sensitiveness, but is much shorter, while the legs are generally longer than in the true snipes, and the tail-feathers are not cross-barred, and sandpipers are further distinguished from the snipes and allies by the well-marked seasonal changes of the plumage. From the plovers the sandpipers may be at once known by the straight and slender bill, and by the possession of a well-developed hind toe, with the single exception of the sanderling (q.v.), as well as by numerous other characters. The true sandpipers are all birds of small and some of diminutive size. Like most of the plovers they are, with few exceptions, gregarious, and frequent the shores of sea, lake and river in large flocks, but they differ from the plovers and resemble the snipes in their mode of procuring food; they probe the soft mud with their slender sensitive bills, and extract from it various kinds of worms, crustaceans and larvæ. Most of the species breed in the north and perform extensive migrations. The simple nests are built on the ground, and the eggs are almost invariably four, and of a strongly marked pyriform shape well adapted to prevent them from rolling away. The young are fully covered with down and are active as

SANDPIPERS

soon as freed from the egg shell. Very nearly all of the sandpipers belong to the northern hemisphere during the breeding season, and as they are especially prone to wander during the migrations, a large proportion of the Old World species have occurred as more or less regular stragglers in North America. Our fauna includes about 25 species exclusive of the related phalaropes, willets, godwits, tattlers, and curlews (qq.v.), all of which, except the last, are by some writers comprised within the sandpiper group.

Some of the species are treated in other parts of this work under the names knot, dunlin, robin-snipe, sanderling, etc. Among other important species are the stilt sandpiper (*Himantopus mexicanus*), which might well be classed as a snipe because of the length of the bill, which is often distinctly curved. The legs are unusually long, and small webs occur between the bases of the front toes. This species is about 9 inches long, and the plumage is much mottled, black, white, tawny and reddish, with a general dark effect in the breeding season; but during the fall and winter grayish and ashy with the absence of black and reddish. The stilt breeds on the shores of Franklin and Hudson bays, and appears in the United States in July and August, but, except in Florida, is rare. It winters as far south as Argentina. The purple-sandpiper (*Tringa maritima*) has the short legs unusually well feathered and the front toes unusually long and margined, the hind toe very short. In its winter dress the plumage is characterized by the distinctly purple gloss of the dark upper parts, the lower being chiefly white. It is a circumpolar species and breeds in the far north, in Iceland, Greenland, Nova Zembla and beyond, and may even winter in Arctic regions. It seldom enters the United States until December, and ordinarily winters in the New England and Middle States, seeking rocky sea-shores in small parties. A few also occur about the Great Lakes and the species is nowhere abundant. A closely related species is the pectoral sandpiper (*T. maculata*), the jack-snipe, grass-snipe or krierer of gunners, the last name in imitation of its call. It is about nine inches long and is readily distinguished from the last by the deeper grooving of the bill, the naked lower half of the tibial portion of the leg and the thickly streaked breast; and from similarly colored species by its larger size. This species is abundant along the Atlantic coast during August and September when the old birds, accompanied by the young of the year, are journeying from their arctic summer home to the pampas of Argentina and Patagonia. In habits this is more a snipe than a sandpiper, as it frequents the salt meadows and grassy margins of pools, and seldom flocks on the sand beaches or associates with related species, though often found in the company of plovers. The spring flight northward follows the Mississippi Valley and few are found at this season along the sea-shore. The male is larger than the female and has remarkable courting habits. As he struts and crosses in front of the female his oesophagus is inflated like that of a pouter pigeon, and at the same time a deep resonant note is produced. The least sandpiper (*T. minutilla*) is in form and color an almost exact miniature of the last, being not over six inches long and the smallest

of the group. It is also known as the stint or peep, and is a typical sandpiper, breeding in British America and frequenting the sea-shore in large flocks along with other species in April and May and in augmented numbers again in August and September. It is, however, found inland, as well, in suitable localities throughout North America and spends the winter from our southern borders to Patagonia. A constant associate of the least sandpiper, which it resembles in distribution, habits and appearance so closely that the two are frequently confounded, is the semipalmated sandpiper (*Ereunetes pusillus*). It may, however, be easily separated by the well-marked webbing between the front toes. Passing over the godwits, willets, and yellow-legs, which form a somewhat distinct group of large species, the well known and much appreciated Bartramian sandpiper, upland plover or grass plover (*Bartramia longicauda*) next requires notice. This species is about one foot long and approaches the tattlers in the cross-barred tail-feathers and unusually long gape which extends below the eye, while the tail is remarkably long and the grooving of the bill is absent from the terminal fourth. The sexes are alike and no seasonal changes occur. It is found in summer and breeds throughout North America, chiefly east of the Rocky Mountains, and spends the winter in upper South America. Unlike most of the group this is an upland bird, preferring dry plains and grassy fields to the vicinity of water. It arrives in early May and shortly after builds a nest of a few straws and grasses in a slight depression on the ground and lays four pyriform eggs of a clay color very thickly spotted all over with small discrete spots of brown and purplish gray. After the breeding season it leaves the meadows for cultivated fields and feeds very largely on crickets and grasshoppers, though other insects and berries are also eaten. This species flies high and swiftly and, unlike most sandpipers, will perch on fences and even trees. It has a peculiar wild cry which is heard by night as well as day. In the east the upland plover, by which name it is best known, is seen chiefly singly or in pairs and families, but in the great grass regions of Kansas and Texas, where it is very abundant, large flocks are formed. A species somewhat closely related to the upland plover in form and habit is the buff-breasted sandpiper (*Tryngites subruficollis*) which is about 8 inches long, breeds in the interior of British America and is nowhere very common during the migrations through the United States. Another related species is the well-known greenish spotted sandpiper or pee-wee (*Actitis macularia*) found everywhere throughout North America along small streams, as well as on the shores of lakes and the sea, and breeding throughout its summer range. To most people it is the most familiar species of all the sandpipers, and requires no description.

To the gunner most of these and other species of sandpipers are classed along with many of the plovers, yellow-legs, curlews, etc., as shore and bay birds, all of which are shot along the entire coast line during the autumn migration. These birds flock to the exposed shores to feed at ebb tide and are gregarious and attracted by their own or kindred species feeding on the beaches. The gunner places wooden decoys, cut and

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painted in rude imitation of the various species, at some favorable point and conceals himself behind a blind of seaweed or brush within range of his stool of decoys. As the birds pause over the latter to examine them, often in compact flocks, a single shot will often kill several, and large bags used to be secured during a single tide; but these birds have been so continuously persecuted that a dozen or two of the larger and medium sized species is now considered ample reward for a day's shooting. Species which, like the pectoral sandpiper, frequent the pools on the salt meadows are also caught by tramping, or tolled within range of a blind by imitating their calls. The sport afforded by the upland plover is of a quite different and more worthy sort. These birds are extremely wary and difficult to approach, and, as they do not flock in the east, may be brought within range only by a most careful approach, while their flight is so rapid as to require the best exertions of a quick and accurate shot. On the prairies of the West this same species is sometimes shot from a wagon, of which the birds are less suspicious. For the table most of the sandpipers are highly prized, and few delicacies surpass a well-turned upland plover.

Consult: Baird, Brewer, and Ridgway, 'North American Water Birds' (Boston 1884); Sanford, 'The Water Fowl Family' (New York 1903).

Sandrart, sänd'rärt, Joachim von, German artist and art critic: b. Frankfort-on-Main, 2 May 1606; d. Nuremberg 14 Oct. 1688. He studied painting and copperplate engraving under eminent painters and engravers at Utrecht and also traveled in England where he was employed by Charles I. and the Duke of Buckingham, and Italy (1627) where he became, at Rome, the intimate friend of Claude Lorraine. Among other pictures, he painted 'The Death of Seneca' for the king of Spain, and a 'Nightpiece' in the style of Honthorst; besides furnishing the illustrations for 'Galeria Giustiniana' (1631). He executed under commission from Urban VIII. several portraits and pictures for the churches in Rome and made a number of sketches in central Italy for M. Zeiter's 'Itinerarium Italiae' and Gottfried's 'Archontologia Cosmica.' On his return to Frankfort he painted for Maximilian I. of Bavaria in the gallery at Schleissheim 'The Twelve Months,' and 'Day and Night.' He subsequently inherited the estate of Stockau, near Ingolstadt, assumed a title and henceforth gave a good deal of his time to art literature, painting also some portraits of the nobility. His masterpiece is 'The Company of Archers assembled to do Honor to Maria de Medici when she visited Amsterdam,' now in the town hall of that city. But his works on art are so important that they have almost obscured his fame as a painter. These books include 'Deutsche Akademie der edlen Bau-, Bild- und Malereikünste' (1675-9); 'Admiranda Sculpturae seu Statuariae Veteris' (1689); and 'Insignium Romae Templorum Prospectus Exteriores et Interiores.'

Sandringham, sänd'rīng-am, England, in Norfolk, 7½ miles northeast of Lynn, is an estate comprising 7,000 acres. It was purchased in 1862 by the Prince of Wales, now Edward VII., who erected a mansion in Elizabethan

style as a country residence. It is surrounded by a charming park of 200 acres. The 'Norwich gates,' the dairy, and the cottages are interesting features.

Sandrocottus, sän-drō-kōt'ūs, the Indian king to whom Megasthenes was sent by Seleucus Nicator in 306 as his ambassador. Megasthenes improved the opportunity to collect materials for his historic work in four books 'Indica,' which is the most important work of Greek antiquity upon that subject. According to this author Sandrocottus reigned over the Gangaridæ and Prasii, nations of the Ganges Valley. After the death of Alexander he extended his dominion over the whole of northern India, subduing even the Macedonians whom Alexander had put in possession of the Indus Valley and the Punjab. Seleucus received 500 war elephants from the Indian conqueror on confirming the cession of this territory, and left Megasthenes as his ambassador at the court of Sandrocottus. This monarch, originally a robber chieftain, may now safely be identified with Chandragupta, whose accession is celebrated in the Sanskrit drama 'Mudrarakshasa.' His capital was Pataliputra (Gk. Palibothra), modern Patna, a city situated in Bengal on the banks of the Ganges, and there he established the Mauryan dynasty. Consult: Schwanbeck, 'Megasthenis Indica' (1846); Müller, 'Fragmenta Historicorum Græcorum' (1841-70); McCrindle, 'Ancient India as Described by Megasthenes and Arrian' (1877).

Sands, Benjamin Franklin, American naval officer: b. Baltimore, Md., 11 Feb. 1811; d. Washington, D. C., 30 June 1883. He entered the navy as midshipman in 1828, was commissioned lieutenant in 1840, and served in the Mexican War. In 1851-9 he was engaged in the coast-survey service, receiving promotion to commander in 1855. In 1862 he was commissioned captain. In 1862-5 he was senior officer in command of the blockade off Wilmington, N. C., participated in both attacks on Fort Fisher, was in command of the blockade off the coast of Texas from February to June in 1865, and raised the flag at Galveston, the last post held by the Confederates. He was commissioned commodore in 1866, was superintendent of the naval observatory at Washington in 1867-73, commissioned rear-admiral in 1871, and placed on the retired list in 1874.

Sands, Henry Berton, American surgeon: b. New York 27 Sept. 1830; d. there 18 Nov. 1888. He was graduated from the College of Physicians and Surgeons in 1856, and later studied abroad. On his return from Europe he became demonstrator of anatomy at the College of Physicians and Surgeons; in 1869 was appointed professor of anatomy, and in 1879 professor of the practice of surgery, holding the latter position till his death. He was attendant or consulting surgeon for several different hospitals, but gradually gave up his hospital work to give his attention to a rapidly increasing private practice. He became one of the foremost surgeons of the city, and was called for consultation in President Garfield's case. His publications include 'Aneurism of the Sub Clavian, treated by Galvano Puncture' (1869); 'Es-march's Bloodless Method' (1875); 'Treatment of Intussusception by Abdominal Method'

(1877); 'Question of Trephining in Injuries of the Head' (1883); and 'Rupture of the Ligamentum Patellæ and its Treatment by Operation' (1885).

Sands, James Hoban, American naval officer; b. Washington, D. C., 12 July 1845. He was graduated from the United States Naval Academy in 1863 and was assigned to the North Atlantic blockading squadron. He was present at the evacuation of Charleston, participated in both attacks on Fort Fisher, and was promoted lieutenant in 1866. In 1865-8 he was on duty with the Indian squadron, took part in the skirmish with the savages on the island of Formosa, and in 1868 received rank as lieutenant-commander. He was promoted commander in 1880, captain in 1894, was in command of the cruiser Columbia at Santiago in 1898 and later joined the expedition to Porto Rico. He became rear-admiral in 1902 and is at present (1904) commandant of the navy yard at League Island, Pa.

Sands, Robert Charles, American author: b. Flatbush, Long Island, 11 May 1799; d. Hoboken, N. J., 17 Dec. 1832. He was graduated from Columbia in 1815, admitted to the bar in 1820, but devoted himself almost exclusively to literature. He established and edited in 1824 the 'Atlantic Magazine' which later became the New York 'Review,' and in 1825-7 was associated with William Cullen Bryant in editing it. From 1827 until his death he was on the editorial staff of the 'Commercial Advertiser.' He wrote with Bryant and Verplanck a series of essays published in the form of an annual, 'The Talisman' (1828-30), in which appears one of his longest poems, 'The Dream of the Princess Papantzin.' He also wrote: 'Historical Notice of Herman Cortes,' in Spanish (1828); 'Life and Correspondence of Paul Jones' (1831); 'The Dead of 1832,' poem (1832); etc.

Sandstone, consolidated sand. The grains of a sand, chiefly silica, may be compacted by pressure alone, forming easily workable freestone, but generally they are held together by some cement, as (1) iron oxide, which coats the grains and cements their adjoining portions, forming a brown-stone; (2) silica, which fills in the interstices between the grains, and generally causes secondary enlargement of each grain in such a manner that the new quartz forms a continuous crystal (as far as optical properties, etc., are concerned) with the old quartz grain, the rock thus becoming a solid mass of crystalline quartz; (3) lime; or (4) clay, forming calcareous and argillaceous sandstones respectively. Impure quartz sandstones may be argillaceous, calcareous, feldspathic, glauconitic or micaceous, according to the admixture. When derived from unassorted disintegration-products of crystalline (feldspathic) rocks, they are called 'arkoses.' Sandstones composed wholly or in large part of comminuted coral or shell sand, cemented by infiltrated calcium carbonate, have been called 'calcareenites,' and make up extensive beds of clastic limestones to which the name sandstone is commonly applied by the quarrymen. Such lime-sandstones may analyze as high as 99.6 per cent calcium carbonate. Ordinarily the term sandstone is applied to quartz sandstones whether pure or impure.

Sandstone very commonly shows lines of stratification or bedding, where exposed in section, and a cross-bedding structure is very common, the various minor layers of a bed being inclined in different and often opposite directions. All sandstones of shallow-water deposit may show ripple marks, rill marks, wave marks and impressions and traces of various animals, while æolian sandstones may show fine bedding and wind rippling, together with great diversity in thickness. Fossils are not uncommon in sandstones, but only their impressions generally remain in the more porous rocks.

In the United States quartz sandstones are widely distributed geographically and geologically. Among the more important commercial deposits are the following: The Cambrian sandstone of New York (Potsdam sandstone), Wisconsin, Minnesota, Michigan, etc. (St. Croix sandstones) and the Rocky Mountain region, as well as early Cambrian sandstones of the southern Appalachians; the Ordovician (St. Peter's) sandstone of the Upper Mississippi; Medina (Silurian) sandstones of New York and Pennsylvania; the Oriskany, Hamilton and Portage (Devonian) sandstones of New York, mostly used for flagging purposes; the Waverly (Lower Carbonian) sandstones of Ohio, which furnishes the bulk of all the whetstones and grindstones of the country; the Pottsville and lower Coal-measures sandstones of Pennsylvania, West Virginia, etc.; the red-sandstones of the Connecticut Valley; New Jersey and Nova Scotia (Jura-Trias); and the Dakota (Cretacic) sandstone of the West.

'Old Red Sandstone' is the term applied to the continental (non-marine) type of deposit formed during the Devonian era in Great Britain and Ireland. This consists of a mass of red sandstone shales and conglomerates from 10,000 to 16,000 feet in thickness and contain igneous rocks aggregating 6,000 feet thick near the middle. From it many remarkable fish-remains have been obtained. New Red sandstone was used for the red sandstone of Permian and Triassic age in Great Britain.

San'idine, or **Glassy Feldspar**, an important rock-forming mineral. It is a variety of orthoclase, is found in tabular or square-prismatic crystals, often Carlsbad twins, frequently quite vitreous in appearance. It occurs only in the recent eruptive rocks such as obsidian, phonolyte, trachyte and rhyolite. Its best known locality is the Drachenfels, Germany.

Sandusky, sän-düs'ki, Ohio, city, port of entry, county-seat of Erie County; at the mouth of Sandusky River, on Sandusky Bay, and on the Baltimore & O., the Cleveland, C. & St. L., the Pennsylvania, the Lake Erie & W., and the Lake Shore & M. S. R.R.'s, about 55 miles west of Cleveland. A number of electric railroads enter the city from Cleveland, Toledo, Lorain, Norwalk, and other places; Johnson's Island, near by, was used as a place of confinement for Confederate prisoners during the Civil War. Cedar Point, Put-in-Bay, Kelley's Island, Middle Bass, Pelee, and Gibraltar islands are all favorite fishing resorts and easy of access during the summer months.

Industries.—The city has steamer connections with all the principal ports on the Great Lakes, and considerable trade with Canada. The city is in a fertile agricultural region, in

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which the chief products are grapes, peaches, apples, grain, and vegetables. Fishing is an important industry of the city; the annual amount sold in the local market and shipped is \$1,500,000. The annual amount of wine shipped is about 2,000,000 gallons. The chief industrial establishments are factories in which are made baskets and crates for the shipment of grapes and peaches; cooperages in which are made casks for the wine shipments; wagon and carriage works, machine shops, corrugated paper, window glass, and underwear factories, carpenters' tools and hoe works, electric dynamo and steam turbine works, structural iron and cement works, and furniture factories. There are large coal and lumber yards. The United States hatcheries at Put-in-Bay and State hatchery at Lakeside foster the fish industry. Sandusky makes the major portion of the crayon which is used in the United States and which is exported. There are three daily and four weekly newspapers. In 1900 the valuation of the output of the industrial establishments in Sandusky was \$3,190,342.

Banks.—There are four banks, two national and two State, having a combined capital of \$650,000.

Public Buildings, Schools, Churches, etc.—The principal public buildings are the government building, county court-house, county infirmary, jail, municipal buildings, and a bonded warehouse. The State Soldiers' and Sailors' Home has accommodations for 1,600 persons. There are, belonging to this home, 37 buildings, constructed of blue limestone, at a cost, exclusive of grounds, of \$700,000. Sandusky has 22 churches, 61 schools and 8 public school buildings, 6 parish school buildings and a public library.

History, Government, and Population.—The city was first settled in 1817, and was incorporated as a city in 1845. The Indians on 16 May 1763 captured Fort Sandusky and massacred the entire garrison with the exception of Ensign Paullly, the commander. In 1782 the Indians defeated a force of 480 men under the command of Colonels Williamson and Crawford. The municipal affairs are administered by a mayor, council, and president, elected under the charter of 1902. Pop. (1900) 19,636; (1910) 19,989. JOHN T. MACK.

Sandusky, a bay indenting the northern part of Ohio, an inlet of Lake Erie. It is 20 miles long and five miles wide, and forms an excellent harbor. In some places large groves extend almost to the water edge.

Sandusky, a river in Ohio; it has its rise near the west boundary of Richland County; flows west to the centre of Wyandot County, then north, and discharges its waters into Lake Erie through Sandusky Bay. It furnishes water-power for manufacturing purposes for several cities and towns on its banks, chief of which are Bucyrus, Upper Sandusky, Tiffin, and Fremont.

Sandwich, Edward Montagu, 1ST EARL OF, English naval officer: b. England 27 July 1625; d. at sea off Solebay (Southwold), England, 28 May 1672. He entered the army in 1645, fought on the side of Parliament at Marston Moor, Naseby, and other places, was appointed a member of the council of state in 1653 and in 1656 became conjoint general of the sea with Blake. In 1660 he joined the forces of Charles, assisted

in the restoration of the monarchy and was created Earl of Sandwich in that year for his services. He was appointed rear-admiral in 1664 and in 1665 participated in the victory at Lowestoft. He was sent as ambassador to Madrid in 1666, and when hostilities with Holland were resumed in 1672 he was made second in command of the fleet. He was killed in the naval action off Solebay in that year.

Sandwich, John Montagu, 4TH EARL OF, English politician: b. 3 Nov. 1718; d. London 30 April 1792. He was educated at Cambridge, traveled extensively in the Mediterranean countries, and in 1739 returned to England where he took his seat in the House of Lords and became a political follower of the Duke of Bedford. He was appointed lord commissioner of the admiralty in 1744 and was shortly afterward appointed captain in the Duke of Bedford's regiment. His promotion in the army was rapid, although his military duties were only nominal, his time being occupied by his duties at the admiralty and his frequent missions abroad, yet at his death he was senior general on the list. He was plenipotentiary at the conference of Breda in 1746 and in 1747 became 1st lord of the admiralty board. In 1751 he was dismissed from service, but in 1755 was appointed joint vice-treasurer and receiver of the revenues of Ireland. He was appointed ambassador to Madrid in 1763, but before he could depart on his mission was made one of the principal secretaries of state. While in this office he took part in the famous prosecution of John Wilkes. In 1768 he became postmaster-general and in 1771 was nominated 1st lord of the admiralty, an office he held for 11 years. His own gain and party interest were made of paramount importance and to the insufficient equipment of the navy was justly laid much of the disaster which the British navy encountered in those years. His administration was on the whole disastrous; perhaps no man of the 18th century was held in more bitter contempt in England than he. He lived a practically retired life after 1782.

Sandwich, England, a cinque port and market-town in Kent. Saint Clement's church is an example of early Norman architecture, and Saint Peter's, dating from the reign of King John, has been restored and contains fine mediæval monuments.

Sandwich Islands. See HAWAII.

Sandy Hill, N. Y., village in Washington County; on the Hudson River, and the Glens Falls Feeder, the Delaware & Hudson and the Hudson Valley R.R.'s; about 52 miles north of Albany. There are rapids in the Hudson and Baker's Falls about 70 feet in descent, which serve to furnish good water-power. Sandy Hill is in an agricultural region, and in the vicinity are quarries of the well-known Kingsbury building stone. The chief industrial establishments are lumber mills, brick yards, furnaces, machine shops, paper and pulp mills, wall paper print works, and the extensive bag factories of the Union Bag and Paper Trust. There are large shipments of stone, farm products, and manufactures. The three National banks have a combined capital of \$150,000. The village has an excellent high school, public graded schools, and a public library founded in 1867, also a public park. It is one of the two county seats of Washington County (Salem the other), has

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a court house and jail; also county clerk's office removed there (1905) from Argyle. Between Sandy Hill and Fort Edward in the Union Cemetery is located the grave of Jane McCrea (q. v.); also that of Major Duncan Campbell of Inverawe, killed at the Battle of Ticonderoga, 1758. Pop. (1900), 4,473; (1910 est.), 5,000. JAMES A. HOLDEN.

Sandy Hook, N. J., a low, sandy peninsula in Monmouth County; about 18 miles south of New York. It begins at the Navesink Highlands and extends north six miles; its width is less than a mile. On the west side of the peninsula is Sandy Hook Bay. At the northern extremity is a beacon light, and, about a mile south of this point, is a lighthouse, 90 feet in height. At the outermost point is Fort Hancock. On the peninsula is a government proving-ground for ordnance and armor-plate.

Sandys, sän'dis or sändz, **Frederick**, English painter: b. 1 May 1832. He is well known as a magazine illustrator, and among his principal paintings are 'King Pelles' Daughter bearing the Vessel of the Sangrael' (1862); 'Vuren' (1863); 'La Belle Ysonde' (1863); 'Morgan le Fay' (1864), and many portraits in oils and crayon.

San'ford, **Henry Shelton**, American diplomatist: b. Woodbury, Conn., 15 June 1823; d. Healing Springs, Va., 21 May 1891. He studied for a time at Heidelberg University and in 1847 entered the diplomatic service and became attached to the Saint Petersburg legation. The next year he was acting secretary to Andrew J. Donelson at Frankfort, and during 1849-54 secretary of legation at Paris. He was United States minister to Belgium, 1861-9, and rendered service of the utmost importance during the Civil War. He negotiated the Scheldt Treaty of navigation and commerce, and the first postal convention with France. In 1877 he was a founder of the International African Association (now the Independent State of the Kongo) and secured the recognition of its independence by the United States. In 1885 he was a delegate to the International Kongo Conference at Berlin, and in 1889 a delegate to the Anti-Slavery Conference at Brussels. In 1870 he founded the city of Sanford, Fla., and in later years gave much attention to its development.

Sanford, Fla., city in Orange County, on Lake Monroe, an expansion of the Saint John's River, and on the Florida, T. & K. W., the Sanford & St. P., and the Savannah, F. & W. R.R.'s, 125 miles south of Jacksonville. The land was sold to Gen. H. S. Sanford in 1870, and he surveyed and cleared the site of the city, and built a saw mill, shops, etc. It is at the head of navigation for large steamers, and exports oranges and other fruits, and early vegetables. It contains railway car shops, machine shops, fruit preserving and cigar factories. There is a public high school. Pop. (1890) 2,016; (1900) 1,450; (1910) 3,570.

Sanford, Maine, town in York County; on the Mousam River, and a branch of the Portland and Rochester railroad; 30 miles southwest of Portland. The land was purchased from the Indians in 1661, and the project of laying out a town was formed as early as 1676, but no permanent settlement was made till after 1730, —the exact date being uncertain. The chief

manufacturing industries include shoe factories, woolen and worsted mills, flour and grist mills, saw and lumber mills; the census of 1900 reported a capital of \$3,246,015 invested. A large electric power shop derives power from the river, and supplies the factories, and lights for the town. There is a high school established in 1874, and a public library which was founded by a library association in 1898, and became a free public library in 1900. The census of 1900 showed that Sanford was the second largest town in the State and exceeded 7 of the 20 cities in population. Pop. (1890) 4,201; (1900) 6,078; (1910) 9,049.

Sanfuentes, sän-foo-än'täs, **Salvador**, Chilean poet: b. Santiago, Chile, 2 Feb. 1817; d. there 17 July 1860. He was the author of various dramatic, historical and poetical works among which are: 'Caupolicán,' drama in verse (1835); 'El Campanario' (1838); 'Chile, from the Battle of Chacabuco to that of Maipo' (1850); 'Teudo' (1858); etc.

Sañgá Sañgá, sāng-ä' sāng-ä', one of the larger islands of the Tawi Tawi group, lying southwest of the island of Tawi Tawi, from which it is separated by a very narrow channel; length northeast to southwest, seven miles; width, three miles; area, 14 square miles. The island is low, and heavily wooded; a little land on the southeast coast is under cultivation.

Sangallo, sāng-gäl'lō, **Antonio da**, Italian architect: b. Florence 1455; d. there 1534. He built in Montepulciano the church of the Madonna di San Biagio; the palaces Cervini and Bellarmini; in San Savino the palace of the cardinal di Santa Prassede, in Arezzo the Church of the Annunziata and the Citadel in Civita Castellana.

Sangallo, **Antonio da** (CORDIANI), Italian architect, nephew of the preceding: b. Mugello, near Florence, 1485; d. 1546. He designed and built the church of Madonna di Loreto, at Rome; the Porta di San Spirito; the church of San Spirito; the palace Sacchetti; the palace Farnese; all in the same city. He also enlarged the Vatican and executed the famous fountain at Orvieto and had a share in building the Pilgrims' Church at Loreto. He was also successful in the construction of fortifications.

Sangallo, **Juliano da**, Italian architect; (brother of Antonio the Elder): b. Florence 1445; d. there 1516. At Florence he built the monastery of Santa Maria Maddalena de Pazzi and the Palace Condi; in Prato, the church of Madonna delle Carceri; in Cajano the Villa Poggio for the Medici. He also constructed the fortress at Ostia; and in Rome he built the façade of Santa Maria dell Anima; the monastery of San Pietro in Vincoli; and the flat roof in the church of Santa Maria Maggiore. He also constructed the citadel at Pisa. Consult: Redtenbacher, 'Die Architektur der Renaissance' (1886).

Sangamon, sāng-gā-món, a river of Illinois; its head-waters are in Champaign and McLean counties. It flows southeast to Sangamon County where it unites with the South Fork of the river, and changes the direction of its course, flowing northwest, then west, then northwest and enters the Illinois River by two channels. Total length, 225 miles. The confluence of the main stream (North Fork) and the South

SANGER—SANHEDRIM

Fork is six miles east of Springfield, and the mouth of the river is about 44 miles west-north-west of Springfield.

Sang'er, Adolph L., American lawyer: b. Baton Rouge, La.; d. New York 3 Jan. 1894. He was graduated from the Columbia College Law School in 1864; and in the practice of his profession won rapid success. In 1870 he was appointed one of the commissioners of the United States Deposit Fund, and in 1885 was elected president of the Board of Aldermen of New York by a plurality of 25,000 votes. He was a presidential elector of the State of New York in 1880 and 1884, and 1886 was appointed commissioner of education, serving for three terms, and elected president of the board in 1893. He was one of the leaders of the Order of "B'nai B'rith" was president of the Board of Delegates of American Israelites, and for some years vice-president of the Union of American Hebrew Congregations.

Sanger, Joseph Prentiss, American soldier: b. Utica, N. Y., 8 May 1840. He served in the Union army through the Civil War, attaining rank as brevet major in 1865, and in 1871 commanded a battery in the Brooklyn "Whiskey Riots." He occupied the chair of military science, tactics, and law at Bowdoin in 1871-5, was a member of the military commission to inspect foreign arms and equipments in 1875-7, and in 1898 was appointed acting inspector-general, and brigadier-general of volunteers. In 1899 he assumed command of the district of Matanzas, Cuba. In 1901 was appointed chief-of-staff and inspector-general in the Division of the Philippines, and in 1902 was made director of the Philippine census.

Sanger, William Cary, American legislator: b. Brooklyn, N. Y., 21 May 1853. He was graduated from Harvard in 1874 and from the Columbia Law School in 1879. In 1895-7 he was a member of the legislature, was lieutenant-colonel of volunteers in the Spanish-American war, and assistant secretary of war 1901-3. He has published: 'The Reserve and Auxiliary forces of England and the Militia of Switzerland' (1903).

Sangir (sǎng-gēr') **Islands**, Malay Archipelago, a group midway between the northeast extremity of the Celebes, and the southern extremity of the Island of Mindanao in the Philippine group. The largest islands of the group are Great Sangir, Siau (Siave, Siauw), and Tagulanda. The former is the most northerly and contains the volcano of Aboe (4,000 feet), whose eruptions of 1812, 1856 and 1892 caused great destruction and appalling loss of life. All of the islands are mountainous, partly volcanic, and well cultivated. From the craters of the volcanoes of Siau and Roang, constantly issue clouds of sulphur, and earthquakes are frequent. The chief products are rice, pisang, sago, and cocoanut-oil. Edible birds' nests abound in the smaller islands, yielding considerable profit. The exports are copra, nuts, and nutmegs. The natives are Malays. They adopted in the 15th century the Mohammedan faith, but were afterward converted to Christianity by the Portuguese. The islands constitute a dependency of the Netherlands, and through the missionaries schools have been built. The islands are governed by Padschas or Princes. Pop. 76,900.

Sangraal, sǎng-grāl'. See **GRAIL**, **THE HOLY**.

Sangre de Cristo, sǎn'grā dā krēs'tō, a range of mountains in the south central part of Colorado. See **ROCKY MOUNTAINS**.

Sangster, sǎng'stēr, Margaret Elizabeth Munson, American writer: b. New Rochelle, N. Y., 22 Feb. 1838; d. 3 June 1912. In 1858 she was married to George Sangster, engaged in writing for periodicals and in 1871 became associate editor of 'Hearth and Home.' In 1873-9 she was editor of 'The Christian at Work,' and in 1889-99 she was editor of 'Harper's Bazaar.' After 1899, she was a staff contributor to the 'Ladies' Home Journal.' Her works are marked by a high religious purpose and an earnest desire to brighten and beautify everyday life. Her juvenile works include: 'May Stanhope and Her Friend'; 'Little Knights and Ladies'; etc. Among her most noted poems are: 'Our Own'; 'The Sin of Omission'; 'Are the Children Home?' and her other publications include: 'Poems of the Household' (1883); 'Home Fairies' (1887); 'Winsome Womanhood' (1900); 'Lyrics of Love' (1901); 'The Little Kingdom of Home' (1904).

Sanguina'ria, a monotypic genus, the bloodroots (q.v.) of the *Papaveraceæ*, indigenous to eastern North America, and often cultivated for ornament. It prefers sheltered places in woods, where it can grow in leaf-mold. The thick, palmately lobed leaf is lapped around the bud, which swiftly outgrows its protector, loses its two fugacious sepals, and opens into a star-shaped flower with several fleshy white petals, and a mass of golden stamens in the centre. The flower closes again at night, or on shady days, since it blooms in the earliest, cool days of spring. The leaves continue to grow during the summer, and become nearly seven inches long. The seeds are contained in spindle-shaped capsules. The whole plant is very brittle and succulent and when broken, especially at its thick fleshy rootstock, an acrid red juice flows copiously forth. This juice has caused the plant to be called bloodroot, and it was considered, by the doctrine of signatures, to be a cure for blood-diseases; later it became officinal, as a cathartic, emetic and expectorant. The sanguinaria is also called red puccoon, or Indian paint, because the aborigines used it as a stain for their skins, and as a dyestuff.

Sanhedrim, sǎn-hē'drīm, the supreme judicial tribunal of the Jews, existing in and before New Testament times. According to rabbinical tradition the institution of the Sanhedrim is to be traced to the time of Moses and the events mentioned in Num. xi. 16, 17, but this view is now generally rejected, and the time of its institution referred to a much later date. The most probable opinion is that it consisted of 71 members, including the president. From incidental notices in the New Testament we learn that the members were drawn from three different classes: "the chief priests," consisting partly of those who had previously filled the office of high-priest, and partly of the heads of the 24 classes into which the priests were divided; "the elders of the people," that is, the heads of tribes and family associations; and "the scribes," or those learned in the law. The Sanhedrim sat

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originally within the temple precincts every day from the conclusion of the morning sacrifice until the evening sacrifice; excepting on Sabbaths and festivals. At its head was a president, who bore the honorable title of *nasi* or prince. The jurisdiction of the Sanhedrim, as the supreme tribunal of the Jews in civil as in ecclesiastical matters, was very extensive. It was the final court of appeal from all inferior courts; and, in addition to this, it alone had the right of judging in matters affecting a whole tribe, of determining questions of peace or war, of trying the high-priest or a disobedient member of its own body. It pronounced also upon the claims of prophets and upon charges of blasphemy. Its jurisdiction was not confined to Palestine, but extended to every place where the Jews had settlements (Acts ix. 2). According to the Jerusalem Gemara the power of inflicting capital punishment was taken away from this tribunal 40 years before the destruction of Jerusalem, and this accords with the answer of the Jews to Pilate (John xix. 37), "It is not lawful for us to put any man to death." It might indeed pass sentence of death, but it required the confirmation of the Roman procurator before such sentence could be executed. The forms of procedure in the court seem to have been characterized by a general spirit of fairness. Different kinds of evidence were carefully weighed, and the agreement of at least two witnesses was necessary to procure a sentence of condemnation. The place of meeting of the Sanhedrim was eventually changed to a portion of the court of the Gentiles, and, after several other changes, its seat was finally established at Tiberias. Besides the high council there were also inferior courts or lesser sanhedrims in the country towns, composed of persons of the same classes, and in contradistinction to these, the metropolitan council was termed the Great Sanhedrim. After the destruction of Jerusalem by the Romans these courts were abolished.

Sanhita, *sān'hī-tā*, the Hindu designation of that part of the sacred writings of the Brahmins, which contains the mantra or hymns.

Sanitary Commission. See UNITED STATES SANITARY COMMISSION.

Sanitary Engineering, the branch of civil engineering which relates to structures and operations for promoting and guarding the health of communities. It deals with the means of providing cities and towns with pure and wholesome water, with the means for the removal in underground channels of the spent water supply called sewage, as well as of such ground water and rain water as may be necessary, with the means of removing the various waste products and refuse by cartage, such as garbage, ashes, and street sweepings. It also deals with the subjects of ventilation, water supply, sewerage, drainage, water purification, sewage and refuse disposal and street cleaning. In other words, sanitary engineering embraces the design and construction of all works contributing to public health and comfort, and all means of preventing offensive conditions due to a large number of persons living closely together, as in cities or towns.

In all cases the sanitary engineer, as is true of the civil engineer, should have for his fur-

ther purpose the construction of his works so as to bring about the desired result at the least cost, when considering both the first investment and the operating expenses.

The relations of the public health to this branch of engineering are made plain in the article **SANITARY SCIENCE**. With the rapid advance of practical knowledge along the latter lines, the profession of sanitary engineering, while resting upon the same foundations as civil engineering, has in recent years gradually called for an increased practical knowledge of vital statistics, of chemistry and biology as applied to its special branches. It is not necessary for the sanitary engineer to be a trained analyst, or accomplished in the details of state medicine, but he should be in touch with the general progress in these subjects, if his work is to be on the highest plane of excellence. This necessity will be better appreciated after noting a brief review of the leading phases of sanitary engineering.

In biblical days, pure mountain water in some instances was collected and conveyed through gravity aqueducts to cities and towns. There are some cases to-day, even in civilized countries, where substantially the same procedures as used many centuries ago are still applied. Generally speaking, however, the rapidly increasing density of population, the wide differences in climatic, geological and topographical conditions, and the improvements made in materials and methods of construction, have rendered necessary a vast elaboration of the early principles, in order to furnish the essential basis upon which modern water supplies under various conditions are built and operated. This is true to a greater degree of sewerage works, which have come to the attention of the American engineer within the past 30 years; and to a still greater degree in the case of works for the purification of sewage and water, and the disposal of garbage, which have even more recently furnished practical problems in this country.

In the field of water supply engineering there are some instances where pure mountain waters can be readily obtained; some where the supplies can best be obtained from underground sources; others where the most available supplies are obtained from rivers near at hand, which require purification and pumping to reservoirs of artificial construction; and still other instances where large cities have at hand only small streams, upon which it is necessary to build large dams to store water during the rainy seasons to serve the needs of the community during times of drought.

Before the development and general acceptance about 1880 of the germ theory of disease, comparatively little attention was given to the sanitary character of water supplies. Although the danger of sewage pollution was then recognized by some, its full significance was not appreciated, especially in the case of watersheds where the population was largely rural in its nature, until there were encountered disastrous typhoid fever epidemics, as at Plymouth, Pa., Lowell and Lawrence, Mass., New Haven, Conn., etc. In recent years there has been a marked awakening to the needs of pure water supplies in America, as shown by the consideration given this subject by a majority of the larger cities, and by the practical accomplishments reached in some instances. Compared

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with the European water supplies, there is yet wide room for improvement in this country, as our prevailing standards are much below those established in northwestern Europe. Thus, in Germany it is an edict of the Imperial Board of Health, following the cholera epidemic in Hamburg in 1892, that no surface water shall be used as a public water supply without first being filtered in a satisfactory manner. In Europe generally this view is held, and the benefit is shown by the fact that the death-rate from such water-borne diseases as typhoid fever is only one fifth to one third of what it is in American cities.

As to the so-called mountain streams, the rapid increase in population in this country makes it each year more and more difficult to obtain even comparatively pure municipal water supplies from sparsely inhabited watersheds. In the case of small cities and towns this can still be done in some instances, but usually it necessitates the purchase of many properties situated on the watercourse, and a systematic patrolling of portions of the remaining area, in order to guard constantly against pollution. This latter procedure is especially effective in conjunction with large storage reservoirs in which self-purification takes place, as in the case of the New York and Boston supplies.

A ground water supply, where the conditions are favorable, yields as good a water from a sanitary standpoint as can be obtained. This results, of course, from the efficient filtration which takes place under the conditions of nature, as the rainfall percolates through the earth and reaches the underground natural reservoirs from which it is drawn. In this country the most notable ground water supply is that which furnishes about half of the supply for the city of Brooklyn, and aggregates a daily quantity of about 50,000,000 gallons. Long Island is essentially a large territory of sand, the pores of which afford facilities for the storage of large volumes of rain-water in this naturally formed reservoir, and from which water can be obtained continuously during ordinary dry weather in daily quantities equal to at least 400,000 gallons per square mile. These conditions are unusual, and there is no other instance where such a large volume of underground water is obtained. Many small cities and towns, however, obtain a satisfactory supply from underground streams, which flow through valleys containing deep layers of porous sand and gravel. With varying conditions in the geological formation, these underground supplies naturally present marked differences in the quality of water obtained therefrom. In some instances the ground water is very highly charged with lime and magnesia, thus making the water too hard for acceptable use by the consumers, and especially by those who use it for steam raising purposes. Under these conditions the sanitary engineer has sometimes to consider the chemical aspect of the problem, and to recommend plans for the softening of the water, such as is the case with the well water supply at Winnipeg, and in many places in the southern part of England, where water is obtained from wells driven into the chalk cliffs.

Another feature which the sanitary engineer has to consider with regard to ground waters is the presence of iron dissolved from the materials in which the underground water is stored, and

which causes it to deposit iron rust, which is seriously objectionable because of the stains it produces in laundry use. This feature can be eliminated by aerating the water and passing it through filters, as is done at Reading, Mass., Red Bank, N. J., West Superior, Wis., and a number of places in the northern parts of Germany and Holland.

Water derived from rivers flowing near cities and towns forms one of the principal sources of supply in America. In early years raw river water supplies were fairly satisfactory in their hygienic condition. But with the rapidly increasing population, river pollution has become so great that now it is rare for a town or city of any size to obtain a fairly satisfactory supply from river water when taken in its raw condition.

In the Southern and Western country there is the added difficulty of the well-known mud-diness, due to the large quantities of silt and clay entering the rivers from soil erosion, and which for many months at a time make the waters decidedly turbid and dirty. To remove this silt and clay constitutes one of the principal tasks of the sanitary engineer. This, as is described in **WATER SUPPLY ENGINEERING**, is accomplished by sedimentation and filtration, and in the last few years a large number of the more important cities have projected, or are building, improvements of this nature.

The cities situated upon the Great Lakes at one time obtained from them clear and pure water quite readily. In the instance of several of the larger cities, however, the time has arrived or is rapidly approaching when there is serious difficulty in obtaining pure water from the lakes in its raw condition, owing to the amount of sewage which reaches the water supply intakes. Usually the pollution is from the city's sewers, but in some instances it is from those of neighboring cities. The earlier intakes, located half a mile or so from shore, were presumably in many cases capable of yielding as pure water as now can be obtained from intakes four miles or more distant from the shore. That the time is approaching when filtration of the lake supplies is becoming desirable, if not necessary, is shown by the consideration given to that subject by the cities of Chicago, Cleveland and Buffalo.

In the northern, and especially in the northeastern, section of the country, water supplies are frequently obtained from small streams, upon which it is necessary to store water in large impounding basins in order that portions of the rainfall of wet seasons may be made available for seasons of drought. This has developed many problems for the sanitary engineer to consider, especially the care necessary in the selection and preparation of reservoir sites to guard against various vegetable growths, such as give rise to objectionable tastes and odors. The storage of water for long periods of time in such basins naturally results in sedimentation, and in bleaching should the water be colored, which improves the quality of the water so far as its appearance and sanitary aspects are concerned, and which incidentally brings about safety through the long interval which elapses as the water passes through the basins, thus bringing about the death of many objectionable germs which enter the reservoir.

The number of filtration works for municipal

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water supplies is rapidly increasing each year, and eventually it is fair to assume will include every important surface water supply in America, as is now the case in the most developed parts of Europe. There are now in this country over 200 filtration plants, the great majority of which are plants of the so-called rapid or mechanical type, which were built at first in a not very durable manner and are lacking in many appurtenances now recognized as essential to good works. While American engineers can design and build good filtration plants, it is an unfortunate fact that up to the present time the filtration plants in America, of both the slow or sand type and the rapid or mechanical type, have not, generally speaking, been well operated, although there are exceptions to this rule in the case of filtration works of each type. The proper operation of waterworks systems to provide palatable and pure water at all times, especially in connection with purification or filtration works, is of exceeding importance, and will require the aid of engineering talent. In this field there appears a favorable opening for many young sanitary engineers. In addition to the sanitary aspect of waterworks engineering, the engineer has frequent occasion to use his judgment and knowledge concerning other lines of hydraulics, including the flow of streams, the construction of dams and reservoirs, pumping stations and distributing systems which will afford suitable quantity of water and pressure not only for domestic use but also for fire purposes.

A sewerage system has for its purpose the collection and removal of the foul waters of a community. The term "sewerage" is applied to the system of collecting pipes and underground channels. It begins in the houses at the various receptacles where water is used for cleansing purposes, extends through the streets and ends at one or more places where this dirty water, which we call sewage, is finally discharged. Sewage contains a small quantity of organic and mineral refuse matter in a condition to be easily and rapidly decomposed. In round numbers it contains less than one part of organic matter and one part of mineral matter to every thousand parts of water. Although this organic matter is so greatly diluted, it is nevertheless capable of causing considerable trouble. It decomposes rapidly, and then putrefaction sets in with the accompaniments of offensive odors, due largely to the growth and activity of those lower forms of life called bacteria. Fresh sewage has no strong or offensive odor. It smells like dish water, and no worse odor than this prevails at the outfall, or points of discharge, in a system of sewers that is not very large but is well planned and carefully maintained and operated.

It is one of the tasks of the sanitary engineer to cause sewage in its flow through the sewers to be discharged both quickly and completely, so as to allow no sewage matters to be retained in the sewers. To this end it is necessary that the pipes be given a grade, or pitch, which will cause the sewage to flow with a good velocity and keep on moving with its suspended matter without interruption, from the starting point at the house to the place of final disposal. It is also necessary to see to it that the curves, bends, junctions, etc., are so designed and built that they will not operate to retard the flow nor allow accumulations of solid matter to remain at various points where they will decompose and

give rise to objectionable odors. To avoid trouble from bad odors it is also necessary to have an open and free communication from the sewers of the houses and streets to the outer air, so that there can either be a free escape or free admission of air, as the case may be, and so that a constant atmospheric pressure is maintained on both sides of all traps to the system.

Due to the variation in the volume of liquid flowing through the sewers at different times of the day, it is impossible to avoid entirely some incidental deposits of solid matters upon the walls of the sewers, and accordingly it is essential from time to time to flush the sewers, that is, to cause a materially increased flow of water intermittently to pass through them, either by natural or artificial means.

The removal of ground water and storm water forms another of the tasks of the sanitary engineer. In some cases they are removed in the same sewers as is the domestic sewage. Then we have a so-called combined system of sewerage. In others there are separate systems for removing the storm water and the sewage. Where cities are situated on very flat areas, drainage is one of the most important municipal works, as at New Orleans, where extensive drainage canals and pumping stations are in operation to collect the rainfall and discharge it into Lake Pontchartrain.

There were very few well-built sewers in this country, prior to 1875, and no city which was equipped with a thorough system. Since 1880 great progress has been made in this branch of sanitary engineering in America, partly due to the fact that American cities, as regards sanitary matters, were far behind the European cities, notably in England and Germany, and partly due to the rapid growth of many communities in this country. Prior to a generation ago the subject of sewage disposal and sewage purification made little demand upon the sanitary engineer, for the reason that invariably the sewage was discharged into the nearest watercourse, and, generally speaking, serious nuisances did not result under the conditions then existing. With the development of sewerage facilities in this country and the increase in population, this subject began to press for attention. In Europe there were a few isolated cases where sewage had been used for purposes of irrigation for 100 years or more, but it was not until the middle of the 19th century that it became the object of careful study in Europe, especially in England.

The first method of purification for the disposal of sewage was that of irrigation, that is, the application of sewage to land to facilitate the raising of crops. In some places, as Paris and Berlin, and many places in England, this is still done with considerable advantage, although in no instance does the income received from the sewage farms equal the capital charges upon their purchase and adaptation for irrigation purposes. In many places, also, it is very difficult and expensive to secure adequate areas of suitable land within any reasonable distance of the community having to dispose of the sewage. This condition resulted about 1850 in England in various efforts to secure those constituents of sewage which may be used for fertilizing purposes in a manner so that they could be placed upon the market. Various chemical treatments to facilitate this end were developed and pat-

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ented, until there was suggested a chemical treatment for the disposal of sewage which involved the use of one or more of nearly every chemical which was then manufactured on a commercial scale. Although all efforts then and since failed to establish any method by which the fertilizing properties of sewage could be availed of with commercial success, this proposition now and then still comes to the attention of the sanitary engineer. The cause of the impracticability of this feature lies in the great dilution of the sewage matters and the expense of handling so much other material to get in available form so little nitrogen, potash and phosphorus. The problem of sewage disposal has been and will continue to be one for the sanitary engineer to solve at the least expense necessary for getting rid of the sewage in a manner so that there will be no sanitary objection to the procedure. Of course this results in different methods for application to problems under the wide range of conditions surrounding the problem.

After 1870 chemical precipitation processes in various forms were introduced throughout Europe, especially in England, where the density of population and the small size of the streams first forced the attention of engineers to this general subject. In some instances chemical precipitation, which can remove under favorable circumstances about 50 per cent of the objectionable organic matter and about 90 per cent of the total suspended matter, was adequate for local conditions. In this country chemical precipitation works were built about 1890 at Worcester, Mass., and were earlier projected for Providence, R. I., although many delays occurred in the carrying out of the works for the latter city. A few small cities also adopted this method of purification, but it seems to have had no widespread development in America, nor are there indications that such will be the case in the future. In England, chemical precipitation methods have in many cases outgrown their usefulness, due to the fact that they are not capable of producing a sufficient degree of purification, and the time is ripe when other and more efficient methods must be considered to supplement chemical precipitation works if the latter are to be used at all. Thus, at Worcester, Mass., several acres of sand beds have been built by which further to purify the effluent of the chemical precipitation works. In New England, generally speaking, sufficient areas of porous land (glacial drift formation) are available, so that the cheapest and best method of sewage purification is afforded by the application of the sewage to land for short periods at a time, between which the land is thoroughly cleansed by the entrance of air. This is called intermittent filtration.

There are two aspects to the problems of sewage disposal. One refers to conditions when it becomes necessary to purify the sewage so as to protect the body of water into which it is discharged, if this is to be used for drinking purposes farther down stream. The other relates to the prevention of over-polluted bodies of water to a degree that results in nuisances from bad odors. In Massachusetts the first of these aspects of the problem of sewage disposal has been developed further than elsewhere in America. Intermittent sand filters have been adopted in numerous cases to purify the sewage with

sufficient thoroughness so that the streams into which the filtered sewage is discharged may be used for drinking purposes. Thus the sewage of the small cities and towns of Natick, Framingham, Marlboro and Westboro is purified to protect the water supply of the city of Boston.

In many cases, however, this is not feasible, and it is necessary to discharge the sewage of a city into a relatively large stream, for a time at least, and let those towns and cities situated on the same stream lower down purify such portion of the river water as they need for their water supply. The practicability of this proceeding depends of course upon a large number of local conditions.

The prevailing method of sewage disposal in America is by dilution in the most convenient water course. Seaboard cities find this method to be generally satisfactory, particularly if the sewage is first carefully screened so as to free it from those particles which would float and be unsightly. Some inland cities can also dispose of their sewage in this manner satisfactorily, but there are others where more or less trouble results at times of low stream flow, and these troubles are bound to increase as the cities grow in size. Many of them are gradually shaping things somewhat toward the ultimate adoption of some form of purification works, but generally the expense is so great that material progress is slow, and it may perhaps only be accelerated by the action of the courts.

Sewage purification works require a continual municipal expense which usually results in comparatively little benefit to those who have to bear it. Accordingly, where land treatment is not available, cities are anxiously awaiting the results of new methods by which the cost of works of artificial construction will be lessened as compared with those of earlier designs. This is true not only in America but also in Europe, where improvements are needed in many cases.

A few years ago much was heard by the sanitary engineer of this country concerning the merits of the so-called septic process and of contact beds made of coke or broken stone, which procedures have been much studied in England since 1895. These methods are intimately associated with biological processes by which the bacteria convert putrescible organic matter into harmless and stable mineral matter. While these processes are not so effective or economical as was at first claimed for them, they have much merit and are worthy of careful consideration, especially in those sections of this country where engineers find no porous land near at hand and when some artificially constructed works become imperative. The disposal of trade wastes is becoming an important factor in some of the industrial centres, and this problem is one which in future years is bound to come more and more within the attention of the sanitary engineer.

In Europe, progress in sanitary engineering commenced at an earlier date than in America, largely because the population abroad was much denser. The need for improvements resulted in laws which compelled the installation of better sanitary works at a rapid rate. In this country the States of Massachusetts, New York, Ohio, and a few others, through their boards of health, have a general supervision of questions

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of water supply and sewerage, so far as the sanitary aspects of new or additional works are concerned. This has been generally helpful, and eventually will probably be extended to practically all of our States. The rules, regulations, etc., of the State sanitary authorities on these matters is a feature of the subject which the sanitary engineer has to consider, as well as the decisions of courts where these form a precedent relative to the sanitary problem under consideration.

Another branch of municipal works to which the attention of the sanitary engineer is beginning to be drawn is the cleaning of streets and the disposal of garbage and other municipal wastes which cannot be removed by water carriage in underground channels. They include ashes, street sweepings, dry rubbish and kitchen garbage, all of which require collection by special cartage. In small communities the disposal of this refuse is not very difficult or expensive, but in the large cities it is frequently a perplexing and expensive undertaking. It is also a very important sanitary matter, as disease, bad odors and general discomfort result from improper and ineffective attention to these matters. Especially difficult is it in America to get a satisfactory disposal of kitchen garbage.

Reduction or utilization processes, by which oil, grease and other commercial products are obtained, have been tried in many cities, but only a few have been operated under conditions to give satisfaction to all concerned. The cremation process, so largely used in European cities, has been tried in some cities, but under conditions placing this process at a disadvantage. This is true not only of the type and arrangement of the furnaces used, but particularly in the matter of their operation. With few exceptions these matters have not as yet been in the hands of the engineer, but there is every reason to believe that before long this branch of municipal sanitation will receive on the part of the educated engineer the same skilful attention as the older branches of sanitary work.

Speaking generally, the accomplishments in sanitary engineering in America since 1875 have been marked by furnishing cities and towns with good water supplies and with efficient sewers and drainage. Improvements in this line began at a later date here than abroad, and in many ways the Europeans are still in advance as regards the carrying out of the well established principles of this subject, although the contributions and experiences of Americans have added much to its general knowledge, especially as applied to the conditions here existing. In no field of civil engineering does there appear a more promising opening for study and practical activity than in the sanitary branch. See also

SANITARY SCIENCE.

RUDOLPH HERING,

Hydraulic Engineer and Sanitary Expert.

Sanitary Science and Public Health.

The term sanitary science is conveniently employed to cover that body of organized knowledge which has to do with health, either personal or public. It is not an exact science like mathematics, but rather one of the inductive sciences like physics, chemistry, and biology, of which last it is a subdivision. Like the other inductive sciences it depends upon observation, generalization, and verification, and includes a body of established doctrines which have been

reached by these processes. From another point of view sanitary science is the science of health, and is, therefore, etymologically equivalent to hygiene. Until quite recently the term sanitary science was used in Great Britain largely to the exclusion of the term hygiene, while in Germany the reverse was and still is the case. The present tendency in America appears to be to employ both terms, with somewhat different meanings attached to each, although the fact that large numbers of medical and scientific men have brought home with them from Germany the term hygiene is unquestionably having its influence in favor of this term in America as well as in Great Britain. The probability is that for the next few years at least both terms will be used, perhaps somewhat indiscriminately, sanitary science and sanitation being applied to the more familiar and more practical aspects of hygiene, such as water supply, milk supply, and food inspection, and especially to its more engineering aspects; while the term hygiene will probably be more often employed for the less familiar, and especially for the more medical and physiological, aspects of the science of health.

Definitions.—In point of fact there is to-day a real and practically important distinction between the two terms. Hygiene in its broadest aspect undoubtedly includes everything relating to health and covers therefore both personal and public hygiene. Of late years, however, with the development of its engineering aspects (sanitation) on the one hand, and its physiological aspects (especially serum therapy) on the other, there has come about a real and practical differentiation between hygiene and sanitation, the former being largely in the hands of physicians, the latter largely in the hands of sanitary engineers. This differentiation has furthermore a sound biological basis; for if we regard health as the normal operation of the human mechanism and disease as its abnormal operation, then it is easy to see how some diseases may be warded off by increasing the efficiency (and especially the vital resistance) of that mechanism, while others may be prevented by an adequate control of the environment. Smallpox, for example, may be warded off by vaccination, a purely physiological or medical, and therefore on our classification "hygienic" process. Typhoid fever, on the other hand, is at present to be prevented chiefly by proper control of the environment,—for example, by the purification of water supplies, the purification of sewage, and the protection of the purity of food supplies such as milk and oysters, "sanitary" problems dealing directly with the environment, and only indirectly with the individual or person. We may, therefore, advantageously employ both terms, namely, hygiene and sanitation (the basis of which latter is sanitary science), keeping hygiene more particularly for procedures directly affecting or dealing with the bodies of the people themselves, and sanitation for procedures dealing directly with the environment and only indirectly with the human mechanism. If, however, the term hygiene be preferred for the whole subject, then obviously the engineering, environmental or "sanitation" aspects of it fall under the subdivision "public hygiene" or "public health," and the remainder under "personal hygiene" or personal health. A good illustration of the present practical

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usage of these terms is afforded by the letter of instructions addressed by the President of the United States to the Panama Canal Commissioners, under date of 8 March 1904, in which the following paragraph occurs:

There is one matter to which I wish to ask your special attention,—the question of sanitation and hygiene. You will take measures to secure the best medical experts for this purpose whom you can obtain, and you will of course make the contractors submit as implicitly as your own employees to all the rules and regulations of the medical department under you.

It is important at the outset to form ideas as clear and definite as possible of the nature of health and disease, terms which though constantly used are often but little understood. We shall probably not go far wrong if we accept the dictum of Huxley that "the characteristic of modern as contrasted with ancient physiology is the conception of the human body as a physical mechanism" and regard the latter as an intricate piece of machinery subject to all the conditions and limitations to which any machine is exposed. If around this essentially mechanical view of the human body we throw that other modern conception, the "environment," that is to say, if we picture to ourselves the human body as a mechanism not only deriving energy from its environment, and doing mechanical and other forms of work, but giving back to the environment heat and waste products (an idea which lies at the very basis of modern physiology), we shall readily arrive at a clear, consistent and helpful conception of the human mechanism and its workings, from which we can readily pass on to clear and logical ideas of health and disease. For in that case we have only to think of the body as a piece of mechanism with all its parts in good working order, or, in other words, sound, normal, and whole, and working in a favorable environment, and to this condition to apply the term *health*. Conversely we may regard any condition of the mechanism in which one or more of its parts (organs) is seriously out of order, unsound or abnormal, or working under unfavorable conditions, as a condition of disease. In the normal, sound or healthful condition the parts of the organism work together with ease, but in the unsound or abnormal condition this may not be the case, and "dis-ease" may be the result. In short, the word *health* (related to the modern word *hale*, old English *hole*) actually means hale-ness or whole-ness, in which form it appears for example in the scriptural phrase "They that be whole need not a physician."

Health and Disease.—Sanitary science then regards health and disease very much as biology regards life, as a special state or condition, and the essential basis of health as sound and proper construction and operation of the human mechanism under favorable conditions. The sources of health are plain. They are obviously good timber, good construction and wise operation or management of the human mechanism to which we must add favorable external surroundings or environment. In so far as sound and normal, or unsound and abnormal, mechanisms are inherited, they are clearly for the most part beyond the control of sanitation and hygiene, but in so far as health and disease are dependent upon good care, management or operation, and especially in so far as they are dependent upon favorable external conditions or environment,

they are obviously to a greater or less extent subject to our influence and control; and herein lies the broad and practical field of the applications of sanitary science. If, for example, observation and experience have established the fact that certain trades are more than usually dangerous, then it is the privilege and the duty of the professors of sanitary science to verify and make known these facts. If it can be shown that certain climates are destructive of health and of life, while other climates conduce to good health and longevity, then it is the duty of students of sanitary science to establish and proclaim this fact. If, as appears from the results of innumerable investigations, polluted water and polluted milk are apt to convey the germs of typhoid fever, these facts may be verified, made known and acted upon.

For the purposes of sanitary science diseases may be roughly classified into two grand divisions, namely, (a) those which are due to defects of material or construction and may hence be described as *constitutional*, and (b) those which proceed more directly from external sources and are plainly due to mechanical injuries, parasites, poisons or other external or *environmental* conditions. These last the sanitarian may hope in part at least to control, while the former, being largely hereditary, are for the most part beyond his reach. It should not, however, be overlooked that the materials and construction of the mechanism may suffer damage from the action of slight or long-continued external influences, or that some so-called "constitutional" diseases may be really *environmental* in origin.

Causes of Disease.—Turning now to the obvious external causes of disease, with which in this article we shall chiefly deal, we may quickly dispose of those which are plainly chemical, mechanical or physical (burning, crushing, freezing, gunshot wounds, dagger thrusts, earthquakes, lightning and the like) of plainly external origin and preventable only by removing or avoiding the cause. In the same way we may set aside deaths by drowning or execution (hanging, electrocuting, etc.), and even suicide in so far as this is produced by external conditions such as loss of friends, loss of property, etc., and not from internal or constitutional defects or changes. Another group of obvious external causes of disease is that series of phenomena which comes under the head of poisons coming in or acting from the environment, such as arsenic, strychnine, morphine, nicotine, caffeine, chloral, alcohol, cocaine, etc. Disturbances of the mechanism due to the entrance of these essentially foreign bodies are only too familiar and are obviously readily preventable by removing or avoiding the cause. There still remains to be dealt with, however, one great class of external causes which may be roughly grouped together under the head of living agents of disease or parasites; including in this term not merely the coarser and more obvious parasites such as tapeworms, fleas, lice, mosquitoes and trichinae, but also those far more elusive and dangerous micro-organisms, the microbes, bacteria, or disease-germs. Some of these have been dealt with elsewhere (see BACTERIA, MOSQUITOES, PARASITES, TRICHINÆ, TAPEWORMS, etc.), but with the relations of these parasites (and more especially of the microbes) to the health of individuals and

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of communities, namely, the public health, we have still to deal.

The Germ Theory.—One of the most fruitful discoveries of the 19th century was the fact that some diseases of previously unknown origin, such as some of the more common fevers—typhoid fever, diphtheria, Asiatic cholera, and tuberculosis—are due to the entrance into the body from the environment of certain micro-parasites, microbes, or micro-organisms. When to this discovery was added another, namely, that these micro-parasites are capable of living for longer or shorter periods outside of the bodies of plants and animals, in the environment of man, and especially in earth, air, water, milk and other materials intimately associated with human life, it became easy to understand, what had up to that time been an insoluble mystery, not only how certain diseases are caused, but also how they are spread among the people and, at the same time, how they may be controlled and even overcome. The whole problem of the prevention, not only of individual cases of disease but of those wholesale attacks of disease upon communities which had long been known as epidemics, plagues and pestilences, now became possible, and one of the most promising fields for the improvement of the health of communities as well as of individuals in the 20th century lies in a further elucidation, along the lines thus marked out, of the precise methods by which diseases are caused and conveyed, and consequently how they may be prevented. To this end not only further knowledge is required, but also an education of the people at large in the elements of sanitary science, so that diseases anywhere arising may be restricted as nearly as possible to their places of origin and there by the arts of disinfection blotted out and exterminated. Once the principle has been clearly recognized that there exists a large class of diseases (known as the infectious and contagious diseases) all of which are probably due to the entrance into the bodies of animals or plants of living external agents, called germs, microbes, micro-organisms or micro-parasites, together with the additional fact that these germs or micro-organisms, microbes, micro-organisms or micro-parasites find their way from person to person either directly ("contagion") or indirectly in devious ways through the environment ("infection")—it becomes a fascinating study to detect and discover the precise routes by which infection and contagion travel, the material vehicles by which the germs in question are conveyed; the conditions of their "longevity" or endurance in the environment under various conditions; their resistance to agents of destruction, such as cold, heat, acids, alkalis and other disinfectants; their distribution from person to person, from community to community, and sometimes even from nation to nation, as they move in or are carried about by water, milk or other food materials; by insects such as flies, fleas and mosquitoes; by wind in the form of dust; by emigrants traveling from country to country; by letters through the post-office; and by linen through laundries, sweatshops, clothing establishments, or otherwise.

Owing to the obscurity pertaining to most epidemics, plagues and pestilences, strange and unusual phenomena were formerly associated with them as causes. Terms such as "miasms,"

"effluvia," "telluric influences," and the like, were commonly used to describe causes of disease not very many years ago, but to-day these have practically disappeared. As a result of the new points of view described in the foregoing paragraphs, infection and contagion are no longer regarded as obscure, mysterious influences, such as strange atmospheric conditions, earthy exhalations or intangible gaseous emanations from swamps or forests, but rather as due to the aggressive activity of specific organisms entering the body and causing within it definite and peculiar alterations. Like bullets, daggers, slivers and other extraneous bodies coming from the environment, these are material, tangible, and recognizable causes of disease, natural rather than supernatural, and simply microscopic rather than macroscopic.

The search for the agents of disease had not, however, continued long before it began to be recognized that the invasion of the body by germs of whatever sort is, to all intents and purposes, an attack upon it by parasites, and once this became clear it was evident that, as in other cases of parasitism, the process is essentially a struggle between the invading parasite upon the one hand and the resisting organism on the other. We now know that the process by no means consists of an active attack upon a passive subject, but is rather a battle or a struggle between host and parasite (for example, between man and microbe), in which the physical, physiological conditions of the host tend on the one hand to overcome and destroy the parasite; while the parasite on the other hand attacks and injures the host in various ways, often by mechanical injury of tissue, and especially by the excretion in the course of its own vital activity of products essentially poisonous or *toxic* to the host. In the case of diphtheria, for example, the diphtheria bacillus first invades the throat of its host or victim, and, having established itself there, feeds and multiplies upon the surface-layers of the epithelium producing meantime a violent poison known as the "toxin" of diphtheria, which substance so damages the cells of the host in the vicinity as to allow a free exudation of lymph, and this, quickly coagulating, produces the white patches of the throat characteristic of this disease. But this is not all. Some of the toxin is also absorbed into the general circulation of the host and produces fever and other general constitutional symptoms of a grave character. Meantime the tissues of a strong and healthy host actively produce what are known as "antibodies" or "antitoxin," a substance capable of neutralizing the toxin either in the body itself or even in a test-tube; and it is owing to the possibility of causing some of the lower animals, especially horses, habituated to the diphtheria toxin, to produce antitoxin in their blood that we have been enabled to secure from these animals this beneficent remedy for use in cases of diphtheria in human beings. In consequence of discoveries of this sort a field of splendid promise has been opened up for 20th-century hygienists, along the lines of *serum-therapy* (as it is called), that is to say, the production of various blood serums rich in antidotes (blood antitoxins) for the poisons generated by the microbes of specific diseases. See ANTITOXIN; IMMUNITY; SERUM-THERAPY; TOXIN.

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Practical hygiene and sanitation, and especially public health work, may thus proceed along either of the two lines indicated, namely, (a) reinforcement of the organism in its struggle with infectious microbes, or (b) exclusion of the microbes and their destruction in the environment. The latter is commonly known as "sanitation" as opposed to serum-therapy or "hygiene." It deals rather with the control of the extrinsic environment than with the control of the intrinsic living mechanism, and it is therefore largely connected with problems of sanitary engineering. See **SANITARY ENGINEERING**.

Public Health.—If, instead of dealing with the individual, we deal with groups or masses of individuals in the form of communities, such as families, villages, towns, cities, states and nations, all the difficulties (and these are by no means few) connected with individual hygiene become enormously multiplied and complicated. It is sufficiently difficult to understand the phenomena of personal health or personal hygiene, but when the problems of the individual under varying conditions dealing with a variable environment are multiplied and complicated by the introduction of those of other individuals with the inevitable effects which these produce upon the common environment, it will easily be seen that the public health problems with which we have to deal are by no means either simple or easy of solution. We need in the first place a precise knowledge of the quantity of life (that is, the population) with which we have to deal, and if over against this we set the total amount of dying within a particular period and then determine the death-ratio (or death-rate), we shall have at least a crude and general measure of the sanitary condition of the community. But if we determine simply the general death rate, we shall not have gone far enough, for it is now well understood that the death rate is profoundly influenced by factors other than disease, such for example as the birth rate, a high birth rate naturally leading under present conditions to a high death rate. It becomes necessary then in any scientific examination of public health problems to go behind the general death rate and to study other conditions. One of the most important of these is the so-called specific death rate, that is to say, the death rate in any given population from particular diseases such as tuberculosis, typhoid fever, pneumonia and the like; for it not infrequently happens that in the presence of a fair general death rate the mortality from typhoid fever (for example) may be excessive. In determining population the census is of the first importance (see **CENSUS**) and a well-regulated census should furnish not merely the total number of the living but the "age periods" of the population, inasmuch as the mortality at different ages varies widely, and no safe conclusions concerning the sanitary conditions of a population can be drawn without careful reference to the constituents of that population at the different age-periods. Space will not permit here a detailed treatment of the sources of error to which students of sanitation, morbidity, death rates and the public health are exposed in various other directions, but which reference to any of the leading works upon vital statistics will readily disclose.

Epidemics.—From the practical point of view there is no more interesting subject connected

with the public health than the rise, progress and decline of epidemics, the study of which now forms a special science known as epidemiology. From time immemorial civilized communities have been ravaged by plagues, pestilences and epidemics, which have at times enormously increased the death rate, as in the famous black death (see **BLACK DEATH, PESTILENCE, PLAGUE**), and thus made serious inroads upon the public health. With the disappearance of such diseases as typhus (ship fever, jail fever) and of scurvy, both of which formerly destroyed thousands even among civilized peoples, attention has of recent years been fixed more particularly upon the bubonic plague, which after a long absence from Europe, has reappeared in great intensity in China and India, and has even threatened the shores of England and the United States. Asiatic cholera, which made a dramatic although brief appearance in the great commercial city of Hamburg, Germany, in 1892 has since been kept at bay in civilized countries. Typhoid fever, however, still remains a curse of even highly civilized communities, largely owing to the fact that it is readily conveyed by food and drink, such as oysters, milk and water, while its specific germs appear to be more than usually hardy or resistant. Tuberculosis, popularly called "the great white plague," and which has always been credited with a very large proportion of the total mortality in all communities, still destroys larger numbers of people than any other one disease. Probably there was never a time (except perhaps in the middle of the 19th century in Great Britain) when a more general scientific, professional or popular interest has been felt in public health problems, and especially in the particular disease last mentioned, than to-day. As a result of the immense progress which has been made in our knowledge of the methods of dissemination of infectious and contagious diseases; and doubtless also in part because of the general improvements which the 19th century has witnessed in housing, heating and ventilation, and the better protection of the health of individuals as well as communities, a distinct decline in the death rate is apparent and a correspondingly greater longevity. It is impossible to determine how much influence should be credited to general improvements, the result of a higher degree of civilization, but after making all deductions it probably still remains true that life is safer and longer to-day than ever before, largely because of a better knowledge of the causes of disease and a better practice of the arts of hygiene and sanitation among the people. The discoveries which have been made in respect to the principal infectious and contagious diseases affecting the human race have within the last 50 years been so extensive and so extraordinary that the names of these diseases have become almost household words, and the methods of dealing with them have become familiar, not only to physicians, but to sanitary experts, trained nurses and the intelligent public in general; and inasmuch as knowledge of this sort lies at the basis of effective promotion of the public health, we may briefly describe the more marked features of some of these diseases and especially the methods of their dissemination and control.

Before we do this, however, we may point

out the remarkable fact that certain diseases which only two or three centuries ago ravaged the human race have been to-day almost completely exterminated from the higher civilizations. The most important of these is probably the *bubonic plague*, which in one form or another appeared in Europe down to the 19th century under the various names of the black death, the plague, and pestilence. This disease is characterized (among other features) by swelling of the lymphatic glands, which turn black and suppurate, being then known as buboes, but it was not until the last decade of the 19th century that these buboes were found to be loaded with microbes (bacilli) capable of producing the disease in certain of the lower animals. Very late in the 19th century this plague, which had previously been for many years almost unknown in Europe and had never, so far as known, visited America, suddenly spread both westward and eastward from China, and menaced the coasts of Europe and America. It has, however, for the most part been successfully held in check, and is no longer greatly dreaded. Its method of dissemination is believed to be by means of rats and fleas, rats being very susceptible to the disease, and fleas which have bitten rats being supposed to be capable of transferring the bacilli to human beings. This point, however, is not yet fully established.

Another disease formerly very prevalent in highly civilized communities, which has within the last century or two practically disappeared, is *typhus fever* (spotted fever, jail fever, ship fever, etc.). This disease, which for a long time was not separated from typhoid fever in classifications of disease, and which resembles it closely, but differs from it in the fact that it frequently causes extensive eruptions and is also lacking in the characteristic ulceration of the bowels which is the distinctive feature of typhoid fever, was formerly greatly dreaded, but, doubtless owing to the improved sanitation (greater cleanliness) of crowded places such as jails and ships, has practically disappeared from among the most highly civilized peoples. How far better food and air have aided in the good work it is impossible to say.

Smallpox, a disease formerly so prevalent that, according to one authority, "scarce one in a thousand escaped it," and so much dreaded that the pesthouse in the early American towns and cities, a constant as well as a repulsive feature, was regarded almost with terror by many of the inhabitants, has of late years been almost exterminated in the most highly civilized countries, and wherever sufficient pains have been taken to hold it in check by means of vaccination and re-vaccination. In the German army, for example, this disease is now extremely rare, apparently for the reason that vaccination and re-vaccination are most carefully attended to. The only serious danger from smallpox to-day is that communities which are unfamiliar with the horrible character of the disease and its ravages because of its scarcity, may come to rely upon improved sanitation or other supposed safeguards and neglect vaccination which, according to all experience, is the only trustworthy defense against this extremely infectious and contagious disease. This danger is aggravated somewhat by the mistaken zeal of

the so-called anti-vaccinationists, who, fixing their attention upon the occasional injuries consequent upon vaccination rather than upon the enormous saving of life which has resulted from its use, maintain a propaganda against it, and seek to have vaccination entirely done away. However earnest and honest these persons may be, there can be no doubt in the minds of those who will take the trouble to review all of the evidence, that their contentions are largely unfounded.

Typhoid fever, a diarrhoeal disease, ever since its clear recognition, about 1840, as a malady distinct from typhus fever, has gradually come to be recognized as one of the most insidious diseases of civilized societies. Its ravages among the uncivilized are doubtless excessive, and even among highly civilized societies it is far more frequent than it ought to be, apparently because the bacilli which characterize and cause the disease are capable of maintaining their life outside the human body in the environment of man for a somewhat longer period and under somewhat more trying circumstances than are the germs of many other diseases. These bacilli are, for example, fairly resistant to cold and to dryness, and, although they are not known to produce spores, they are apparently able to persist for a long time (in greatly diminished numbers) in sewage, water, ice, and upon fruits, vegetables and other articles of food. In milk under certain circumstances they may even multiply, and a very large number of epidemics of typhoid fever has been traced to infected milk. The same thing is true of drinking-water, and, since 1894, when an extensive epidemic of this disease, due to infected oysters, occurred among the students and others in Wesleyan University, in Middletown, Conn., many investigations have been made, both in Europe and in America, tending to show that raw oysters are not infrequently grown near the mouths of sewers and that such oysters may readily convey the germs of this disease. Furthermore, since it has become known that the bacilli of typhoid fever occur not only in the bowel discharges, but also in the urine, and even in the sputum of persons sick of this disease, it has become easy to understand the fact that it is often really as well as apparently contagious, although of course in far less degree than the eruptive diseases, such as smallpox, measles and scarlet fever.

Malaria and malarial fever had long been associated in the popular mind with swamps, but until 1880 no germ characteristic of these diseases (which are really one and the same) had been discovered. In that year Laveran, a French investigator in Algiers, discovered in the red blood-cells of persons sick of the disease certain animal parasites, protozoan in character, which appear to be not only the constant accompaniment, but the sufficient cause of the disease. Quite recently Ross in England, Celli in Italy, and various other observers have proved beyond reasonable doubt that these germs are conveyed from one human being to another by means of certain female mosquitoes, belonging to the genus *Anopheles*, without the bite of one of which containing the microbes, the disease does not appear to be transferable. The life history of these parasites has been worked out thoroughly, and to-day it is universally believed that malaria is caused

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by the parasites mentioned above, which spend only a portion of their normal life in their human host, and the remaining portion in the bodies of mosquitoes of the genus *Anopheles*. The importance of this discovery can scarcely be overestimated, for although formerly, as already stated, malarial fever was associated with swamps, no one could tell precisely how; while to-day it is easy to see that if swamps contain infected malarial mosquitoes they may be dangerous sources of disease for human beings. On the other hand, it had long been observed that it was not swamps *per se* which produced malaria, inasmuch as thousands of swamps had never been brought under suspicion. This circumstance is now interpreted as due to the fact that whatever mosquitoes may have been present in the swamps in question must have been of some other genus incapable of transmitting the disease; or else, if of the right genus, then these *Anopheles* had never become infected by biting human beings suffering with malaria. The practical importance of these discoveries in regard to malaria cannot easily be exaggerated, for malarial fever has long been the dreaded pest of the engineer, and such enterprises as the digging of the Panama Canal have been enormously hampered by the prevalence of malarial and other fevers. Nowadays it suffices to make sure that all sleeping huts or houses are covered with nettings which shall keep out mosquitoes, and that if possible the breeding places of these pests shall be either drained and altogether done away or else petiolized, that is, treated with oil of some sort which shall interfere with the breeding of mosquitoes.

Tuberculosis has long been recognized as one of the worst diseases afflicting the human race. It is characterized by certain cheesy masses called tubercles, which may be formed either in the lungs or upon the membranes of the brain, in the lymphatic glands, or even within the tissues of the face, the disease in this last case being known as *lupus* (a wolf), and causing serious disfigurement. In 1882 Dr. Robert Koch discovered within these cheesy masses small microbic rods or bacilli to which he gave the name by which they are now universally known, of the *Bacillus tuberculosis*. These bacilli frequently occur in the sputum of tuberculous patients, and if this sputum is cast out upon the streets or in public places, it may become dried and disseminated in various ways, for example in dust. The bacilli are believed to be disseminated also by the coughing of fine moist particles from the lungs of tuberculous patients into the air; by milk derived from the tuberculous udders of tuberculous cows; by kissing—as when, for example, a tuberculous mother kisses her young child; by the hands,—as when a tuberculous patient, coughing upon his hand, afterward, without having washed it, touches the hand of another, or articles of food which are eaten raw; and in a great variety of other ways. Here also much is being done by boards of health and other sanitary organizations which seek to control the spitting nuisance, by physicians who educate tuberculous patients to use destructible spit-cups, handkerchiefs, and the like; by sanatoria, that is, establishments intended especially for the benefit and cure of cases of *incipient tuberculosis*, and by a campaign of education consisting largely in the dis-

tribution of literature bearing upon the disease. Among the most noted sanatoria for tuberculosis in the world are those at Davos Platz, in the Italian Alps, and at Saranac Lake, in the Adirondacks. More recently state sanatoria have begun to be established, the first in America being that of the State of Massachusetts, at Rutland, Mass. It was formerly thought necessary for incipient tuberculous cases to be removed to Colorado or other high, dry localities, but to-day it is commonly felt that, however desirable a removal of this kind may sometimes be, it is not always wise, and that the essentials of a good sanatorium (which are largely fresh, dry air and good feeding) may often be found near a large city, the first institution of this kind to be established (namely, the Sharon Sanatorium at Sharon, Mass., only 16 miles from Boston, upon a slight elevation and a dry, sandy soil) having proved eminently successful.

Diphtheria, or malignant sore throat, has of late years come, unhappily, to be quite common, and is rightly much dreaded. The causative germ of the disease was discovered and described by Loeffler, a pupil of Koch, in 1884, since which time it has been very widely studied, and has been found to do its damage by producing in the bodies of its victims, or even when growing in beef tea, a highly poisonous substance known as its toxin. Until 1892 no remedy for it was known, but in that year von Behring of Germany announced the discovery of that remarkable antidote for the disease, now universally known as diphtheria *antitoxin* (see above). Behring was led to his magnificent discovery by reflecting upon the fact that some animals are immune to diphtheria and by discovering that the blood of such immune animals is capable of neutralizing the poisonous character of the toxin produced by the germs of diphtheria. The manufacture of diphtheria antitoxin is now a large industry, sometimes carried on under private and sometimes under state or municipal control. There can be no question that its use has largely diminished the mortality from this disease.

There are many other diseases such as leprosy, scarlet fever, measles, and pneumonia, a knowledge of which has of late years become more precise and practical, but these cannot be referred to within the limits of this article.

Engineering Enterprises, such as drainage and sewerage, water supply, the filtration of water, the purification of sewage, the cleaning of streets, and garbage collection and disposal, have had much to do in the past, and will doubtless have much to do in the future, with improvement of the public health; and there is every reason to hope that the general death rate may continue to diminish, as it has diminished, in the past, largely by virtue of these enterprises. In addition, however, much remains to be done; the more crowded sections of cities—the so-called slums—require the most careful supervision to prevent overcrowding, bad ventilation and accumulation of noxious or even toxic wastes. The milk supplies of cities are as yet very largely in a primitive state so far as the production of milk is concerned, and it will become necessary in the near future either to improve radically the conditions of its production or else to abandon almost altogether the use of uncooked milk. Vegetables, fruits and berries, which are eaten in the raw

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state, such as celery, lettuce, radishes, water-cress, cherries, and strawberries are peculiarly exposed to infection either by handling or because they are frequently treated with manure-water during the process of growth, and such water is not infrequently polluted and infected. The dangers from oysters have already been referred to. How far uncooked or underdone meats are dangerous is uncertain, although it is well known that uncooked ham and other lean meat of hogs has frequently caused trichinosis, an infection due to minute parasitic worms.

Illuminating Gas, particularly water gas, which contains a large percentage of carbonic oxide (CO), has an important bearing on the public health, not when properly burned or by its products of combustion, but because of leaks in the mains or the service pipes, or about the fixtures by which it is distributed. Many deaths occur annually from this source, and the use of water gas should be accompanied by special precautions.

As for the effect of *public gymnasia, playgrounds* and other open places in cities or other crowded communities little need be said, inasmuch as it is impossible to determine their precise value. There can be no question, however, as to the general wisdom or advantage of such things in modern cities. Isolation hospitals for infectious diseases are gradually being established in our larger cities, and are filling a long-felt want. Best of all, the recent improvements in transportation are making it possible for large numbers of persons to live near, rather than within, cities, and suburban life is becoming as characteristic a feature of modern life as is city life itself. Unfortunately this remedy for the evils of city life applies only to the fairly well-to-do, for the very poor will probably always find it easier, cheaper and more exciting to live closely crowded in the congested centres of population, where work is most abundant and where the incidental diversions of a varied and noisy city life may be had free of cost.

The public health problem is very largely, but not exclusively, a problem of the life of crowded communities. Yet something needs to be said concerning the *sanitation of farms* which, while they ought to be the healthiest places in the world, are by no means always such. Damp or even wet cellars, bad ventilation, overheating and poor feeding; defective sanitary arrangements, shaded houses, and unwholesome surroundings, or close association with domestic animals, such as dogs, cats and poultry or swine, too often make farm life unsanitary, and boards of health having in charge the sanitation of States or Territories should give attention to these problems as well as to those of more crowded communities. *Railway sanitation, steamship sanitation*, and the more technical aspects of the work of boards of health, such as *disinfection, scavenging, quarantine, isolation, vaccination* and the like, are nowadays subjects of great public consequence and are fully treated in special works or memoirs, reference to some of which will be found at the end of this article.

There are few more interesting matters relating to the public health than the control of the adulteration of foods and drinks. In spite of the increase of general intelligence, flaming advertisements of quack medicines too often disfigure the pages of the newspaper press and

testify to the enormous use of patent medicines, drugs, etc., by the public at large. In many States special laboratories are maintained for the investigation of foods and drinks, and stringent laws exist for the regulation of their adulteration and sale. One of the most striking facts which these have disclosed is that many of the so-called compounds, tonics, sarsaparillas and other patent foods or medicines are rich in alcohol, some of them containing as much alcohol as many kinds of wine or beer. Some which profess to contain certain ingredients are totally lacking in them, and others which profess to cure the alcohol habit or the morphine habit actually contain alcohol or morphine respectively, occasionally in large quantities. The revelations which proceed from these State laboratories are sometimes startling, and any one interested in the public health should inform himself upon this subject, as he may readily do by turning, for example, to the 'Annual Reports of the State Board of Health of Massachusetts.'

State and Municipal Laboratories are thus an important and modern adjunct to the public health work of boards of health. In the best of these means are provided for the rapid and certain diagnosis of doubtful cases of diphtheria, typhoid fever, malaria, hydrophobia, glanders, anthrax and some other infectious diseases. In them also analyses of milk, water, ice, sewage, vinegar and other liquids, of illuminating gas and of air, and of substances subject to infection or adulteration may be made; foods and drinks may be examined; materials for pavements or buildings may be tested and a great variety of useful operations conducted, all tending to a better knowledge of local sanitary conditions. It is doubtful if any arm of the public health service is to-day more important than this. Largely in consequence of all these and many other efforts now making for the improvement of the public health, human life is probably to-day safer and happier than it has ever been before, and the outlook for further progress is very bright. See SANITARY ENGINEERING.

Bibliography.—Buck, 'Treatise on Hygiene and the Public Health'; Sedgwick, 'Principles of Sanitary Science and Public Health' (1902); Harrington, 'Manual of Practical Hygiene for Students, Physicians and Medical Officers'; Palmberg, 'Treatise on Public Health and Its Applications in Different European Countries'; Blyth, 'Manual of Public Health'; Abbott, 'Hygiene of Transmissible Diseases'; Baker, 'Municipal Engineering and Sanitation'; Chapin, 'Municipal Sanitation in the United States'; the annual reports of the state boards of health of Massachusetts and Connecticut; monthly bulletins of the state boards of health of Massachusetts, Connecticut, Vermont, Michigan, etc. The principal periodicals are: 'Public Health Reports,' Washington, D. C.; 'Public Health,' London; 'The Journal of State Medicine,' London; 'Journal of the Sanitary Institute,' London; 'Revue d'Hygiène,' Paris; 'Zeitschrift für Hygiene und Infektionskrankheiten,' Leipzig; 'Archiv für Hygiene,' Munich and Berlin; 'Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege,' Brunswick.

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SANJAK — SANSKRIT LITERATURE

Sanjak, sān'jāk, from the Turkish signifying "a standard," the name of the subdivision of a Turkish province, administered by a *mutessarif* or governor of the second rank.

San'key, Ira David, American evangelist: b. Edinburgh 28 Aug. 1840; d. Brooklyn, N. Y., 13 Aug. 1908. He engaged in business at New Castle, Pa., 1855-71. In 1871 he joined the late Dwight L. Moody (q.v.) in evangelistic work and continued with him for many years, conducting the singing and furnishing solos. His religious music attained great popularity. He compiled 'Gospel Hymns' (1875-95); 'Sacred Songs and Solos' (1873); 'Winnowed Songs' 'Young People's Songs of Praise' (1902).

Sankhya, sāng'khyā, the name of the chief philosophical system of India. Its doctrines are attributed to the sage of Kapila, fabled to have been a son of Brahma and an incarnation of Vishnu. It teaches the eternity of matter and spirit independent of a Supreme Being, and propounds a code of 25 principles, by the observance of which eternal happiness or complete exemption from every kind of ill may be obtained by the faithful. Sankhya philosophy is supposed to date from a period anterior to the 8th century B.C.

Sannazaro, sān-nād-zā'rō, **Jacopo**, Italian poet: b. Naples 28 July 1458; d. there August 1530. His 'Arcadia,' a series of idyls, although like his other Italian poems, the work of his youth, still retains its reputation. His poetry attracted the notice of King Ferdinand and his sons Alphonso and Frederick, and the latter, companion of their journeys and campaigns, who ascended the throne in 1496, gave him the villa of Mergellina, with a pension of 600 ducats. Sannazaro wrote sonnets and *canzoni* in Italian, several Latin poems, elegies, eclogues, epigrams, and a longer poem, 'De Partu Virginis,' in three books. His elegance of expression, no less than the poetical beauty of his thoughts, give him a distinguished place among the modern Latin poets. There is a 'Life' in Italian by Crispo (1723).

Sans-culottes, sānz-kū-lōt' (French, "without breeches"), the name given in derision to the Jacobins or popular party by the aristocratical in the beginning of the French Revolution of 1789. Like the epithet *gueux* bestowed on the patriot party in the Netherlands, and like that of *Methodists* bestowed on the friends of Wesley, it was adopted by those to whom it was first applied by way of contempt. At the time when the most exaggerated principles of democracy prevailed *sans-culottism* became a term of honor. In the French republican calendar the *jours complémentaires* were at first called *jours sans-culottides*.

Sans Gene, sān jān, **MADAME**, a name given to the wife of Marshal Lefebvre, Duke of Dantzic who was elevated from the ranks by Napoleon I. The term itself signifies "without constraint," or, in its application to a person, one who lives outside social conventions or restraints either through ignorance or defiance of the usages of good society. Madame Lefebvre was well suited to bear this sobriquet, having being first a washerwoman, then a *vivandière* when her husband served in the ranks, and finally

the butt of much ridicule when raised to the courtly position her husband's rank entitled her to fill. She, however, often triumphed over her conditions by natural shrewdness and a high-strung temper. The character possessed great dramatic possibilities which Sardou utilized in 1893 in a play for Mme. Rejane. The part has been played in English by Ellen Terry and Kathryn Kidder.

Sans-Souci, sān soo-sē (French, "without care"), Potsdam, Prussia, a royal suburban park containing besides two modern palaces, the one-storied palace built by Frederick the Great, 1745-7, near the site of the mill kept by the independent miller, hence styled "sans souci," who had successfully opposed the monarch's attempts to remove his building.

Sansevieria, sān'sēv-i-ēr'i-ā, a botanical genus of the *Hamodraceae* of tropical Africa and the East Indies, named in honor of the Prince of Sansevierio, a Neapolitan. It includes tender foliage plants useful in window gardening, since much sunshine is not necessary for their welfare, and they are easily propagated by division or leaf cuttings. The sansevierias have thick rootstocks, bearing tufts or rosettes of rigid, sometimes stem-like leaves, from 1 to 4 feet long; and, in the species cultivated in America these are sword-shaped, terete or oblanceolate, dark-green and banded more or less with grayish-white. The flowers have long and slender perianths, are white, and clustered among dry bracts in a dense raceme, rising from the centre of the group of leaves on a tall naked stalk. Bowstring hemp, used in India, is the long, durable fibre, also called Moorva and Marool, which is obtained from the East Indian *S. zeylanicum*.

Sanskrit Literature. Sanskrit is the Anglicized form of *samskṛtā* (from *sam*, a preposition of intensifying force in compounds, and the root *kr* "to make," cognate with Latin *creare*), "the adorned" or "perfected," that is, "speech." It is employed to designate the second period in the literary development of the Aryans in India. For the first period, see **VEDIC**.

Distinction of the Two Periods.—The difference between Vedic and Sanskrit literature is not merely one of time, but extends to matter, spirit and form. The literature of the first period is religious, that of the second in spite of a marked tendency to moralize is profane. The purpose of the first period is practical, its primary object being to obtain happiness in this world. The second period in consequence of the doctrine of transmigration is filled with the idea of the misery of all existence, and its purpose is artistic, to satisfy an intellectual want. As the literature of the first period was practical, a natural prose style had been developed in the Brāhmanas. The artistic purpose of the second period led to the almost total abandonment of prose in favor of verse, often to the detriment of subjects requiring exact treatment, for example, the law. Prose when employed is either mingled with verse as in parts of the epic, the drama, fairy tales and beast fables; or so artificial as in the kāvyas or prose romances, that conform to the rules of poetics; or so awkward and obscure, as in the grammatical and philosophic treatises, as to be hardly worthy of being called prose.

SANSKRIT LITERATURE

Striking as these differences are, they are in reality less important than the less obvious changes that have taken place in the language. Hence it is quite appropriate that, while the first period is named from its literature, the second is named from its language—the Sanskrit.

Development of the Language.—The difference between the language of literature and that of everyday life, is always of cardinal importance, but nowhere is it more strongly marked than in India. That it existed even at the time of the composition of the hymns of the Rig Veda, is unquestionable. The language in which the "hieratic" hymns are composed is no spoken language, but an artificial dialect that was transmitted from generation to generation in the families of the priestly singers. This is shown by the fact, that in spite of varying authorship, there is nothing like dialectic variation within this class of hymns. It is evidenced also by the way in which forms of different periods appear side by side; by the unthinking repetition of phrases; by incorrect uses of words and forms; by false formations and by the way in which the necessities of the metre are allowed to determine the choice of synonymous forms. The language of the priests themselves may have approximated to this type with the omission of the most archaic and poetic elements; but the language of the masses of the people must have been very different. Positive proof of this is afforded by the fact, that some words in the Rig Veda show already the phonetic peculiarities that are characteristic of the mediæval dialects. Such words must have originated in the language of the lower classes and thence made their way into the literary language. They show that the language of the lower classes had already advanced far in its development. The differences between this hieratic type of language and that of the popular hymns have generally been interpreted as due to differences in time; and attempts have been made to assign the different hymns to different periods on this basis. It has recently been shown, however, that the forms that have been considered evidences of later date are frequently prehistoric and hence, certainly, as old if not older, than the forms of the hieratic language; and that the language of the popular hymns is not a continuation of the language of the hieratic hymns, but that we have in these types parallel dialects, whether their difference be geographical or, as seems more probable, due to their employment by different social strata. The language of the Brāhmaṇas and Sūtras again is a continuation of neither of these types, but must be considered as an adaptation to literary purposes of the language spoken by the Brahmins at the time and place of their composition, under the influence of the literature that already existed.

Finally, there was fixed in the grammar of Pāṇini a type of language closely related to that of the Sūtras. This eminent grammarian from the northwestern part of India, whose date may be assigned to the 4th century B.C., represents the culmination of the grammatical studies that had their beginnings in the Brāhmaṇas. Of predecessors he mentions no less than sixty-four; but the success of his grammar has led to the disappearance of their works. His grammar became the standard for the classic language so absolutely, that from this time the language is fixed—there being no further development

of language but only of style. This language is called the Sanskrit, that is "the adorned" or "perfected" in opposition to the Prākṛit or plebeian dialects. That it was not the pure creation of the grammarian's brain but based on actual spoken usage is evident; for some of the rules of his grammar would have no significance except for a spoken language, and there are early traces of dialectic variation. We are expressly told that in the 2d century B.C. the inhabitants of the Āryāvarta or "land of the Aryans" that is the country between the Himālaya and the Vindhya Mountains, were the speakers of the standard Sanskrit. But this does not apply to all the inhabitants of that district. The distribution of the dialects in the drama probably continues a much earlier tradition; here men of the two upper castes speak Sanskrit, those of the lower castes and all women speak Prākṛit. As all converse with one another, and the production—the same applies to the recitation of the epics—must have been intelligible to the audience it follows that Sanskrit must have been intelligible even to those who did not speak it, and that its speakers must have understood also the vernaculars. Its position must have been like that of Latin in the Middle Ages or that of Hebrew among the Jews and such is its position in India at present. In the whole of the classic literature is composed, so that we have the spectacle of the literature of a nation under the domination of a single grammar for centuries, in a way that is without parallel in the history of the world. This language and literature spread throughout the Indian peninsula and further south to Ceylon, to Borneo, Java, and the Philippines, into further India, Burma, and Siam, and, owing to the influence of Buddhism, into central Asia, Tibet, China, and Japan.

With regard to the differences between the classic language and the various forms of Vedic it is to be noted that the phonetic status of the language has remained almost exactly the same, that there has been no important addition to the formative or inflectional elements, but that the change has consisted partly in dropping forms that seemed superfluous, partly in settling the usage in favor of one form, for which two or more forms of synonymous value had previously existed; and finally that the vocabulary has been increased by new formations made with the means that were already at hand. The nature of these changes also shows that we are dealing with a literary language. The natural development of the language of the Aryans in India is to be seen only in the speech of the lower classes. The existence of these vernaculars by the side of the literary language is attested, as has been noted, from the time of the Rig Veda. In literature they appear only with the rise of the two great heresies Jāinism and Buddhism. These in their oldest phases employ the Prākṛit and Pāli dialects, afterward they too resorted to Sanskrit, so that Prākṛit remained in literature only in certain parts of the drama in which it had a traditional right. From these mediæval dialects were evolved in turn the modern dialects, the literary employment of which begins about the 11th century of our era.

Sanskrit Literature.—By Sanskrit literature is meant, therefore, the literature which is composed in the language that conforms to the grammar of Pāṇini. Certain parts of the Epics are

no doubt older than that grammar, but it is impossible to tell exactly which these parts are, and moreover in the later working over of this material the tendency has been to bring it into harmony with the classic standard. It will be seen, therefore, that there is no sharp chronological line that can be drawn between the two periods; because on the one hand the beginnings of the classic literature go back to the time before Pāṇini and on the other the later monuments of the Vedic literature were produced after that date. The wealth of the classic literature is enormous, every department except history being well represented, and it will not be possible to give more than the briefest mention of the most important authors and works.

Epic Poetry.—Two classes of works are to be distinguished: Itihāsas, Ākhyānas or Purāṇas, "ancient tales," and the Kāvya or artificial epics. The chief representatives of each are the Mahābhārata and the Rāmāyaṇa. The first is a heterogeneous mass of about 100,000 distichs. The main story is the strife of two Aryan tribes, the Kurus and the Pāṇḍavas. To this only about one fifth of the poem refers. The remainder consists of episodes and didactic disquisitions chiefly on the duty of the warrior class that have changed the poem from an epic to a dharma-śāstra or legal text-book. The Mahābhārata itself recognizes the nature of its origin, when it gives as its author Vyāsa, "redactor." It is known to have reached its present form by 500 A.D. and probably had become a dharma-śāstra by the beginning of our era, while the epic nucleus may be some five centuries earlier than that date. The eighteen Purāṇas that have been preserved are of much later date. Their original character has been changed by abridgement or omission of the ancient tales and the substitution of didactic elements. They are all sectarian, generally Viṣṇuite. The Rāmāyaṇa, a poem of some 24,000 distichs, is for the most part the work of a single poet Vālmiki. Its subject is the story of Rāma, especially the abduction of his wife Sītā by the demon Rāvaṇa who carried her to his stronghold Lankā in Ceylon, from which she was rescued by Rāma with the help of Hanuman king of the monkeys. In the later additions Rāma is made into an avatar of Viṣṇu. The story has been interpreted as a historical allegory, but is more probably merely mythological. The main portion of the work is probably older than the formation of the epic kernel of the Mahābhārata. The Kāvya, or artificial court epics, extant range from the time of Kālidāsa (the beginning of the 5th century) to the 12th century, though there is epigraphic evidence to show that this style of poetry originated before our era and continued in vogue. Of these the most important are the Raghu-vaṇṣa, 'The Family of Rāma' and the Kumārasambhava, 'Birth of the Wargod,' of Kālidāsa. As Kāvya are also classed certain prose romances of the 6th and 7th centuries—the best known being the Daśa-kumāra-carita of Dandin or 'the Adventures of the Ten Princes.'

Lyric Poetry.—Long lyric poems are rare. Such are Kālidāsa's Meghadūta, or 'Cloud Messenger,' in the 115 stanzas of which an exile implores a cloud to bear to his wife the message of his love; and the highly poetical description of the seasons from the point of view of a lover, by the same poet entitled, Ritu-samhāra, 'Cycle

of the Seasons.' More frequently each stanza is a poem in itself: these are published in collections frequently styled Ġatakas, 'Centuries.' Religious lyric poetry is represented by similar collections. Famous in both departments was Bhārṭṛhari (of the 7th century).

Drama.—This is the department in which Sanskrit literature has reached the highest point of merit. Noteworthy are the resemblances to the Elizabethan drama, the absence of tragedy, the mixture of prose and verse, and the employment of different dialects, mentioned above. The origin of the drama is obscure, but there is no reason to assume Greek influence. Etymology points to the original prominence of dancing. Combined with song and pantomime it constitutes the germ from which by the addition of the dialogue—at first extemporized—the drama was evolved. The first and greatest of the dramatists is Kālidāsa and his masterwork is the Ġakuntalā. Besides this have been preserved the Vikramorvaṇi and Mālavikāgnimitra. Bhāvabhūti of the 8th century is the next in fame: of his works remain, the Mālati-mādhava, Mahāvira-carita, and Uttara-rāma-carita. Between these in time are the Mṛcchakatikā, 'Clay Cart' and the Ratnāvali, 'Pearl Necklace,' attributed to the kings under whose patronage they were brought out.

Fairy Tales and Fables.—This department is historically most interesting because of its deep influence upon the mediæval and modern literature of Europe. Characteristic is the human-like role assigned to the animals; the mingling of prose with poetry of a gnomic character and frequently of a high order of merit; and the system of arrangement, story being set in story as in the Arabian Nights. The source of the beast fables is the Jātakas or Buddhist birth stories, the chief character being identified with Buddha in a previous existence. Works of this class are called Nīti-śāstras or 'Text-Books on Good Behavior,' being intended for the political and ethical training of princes. They have been recast by the Brahmans in the interests of their religion. Of these the oldest is the Pañca-tantra, so called from its five books. Its existence in the 6th century is proved by its translation at that date into Pehlevi. From it chiefly is derived the Hitopadeśa, 'Book of Good Counsel,' the manuscripts of which go back to the 14th century. The most important collection of fairy tales is Somadeva's Kathā-sarit-sāgara, 'Ocean of the Streams of Stories,' of the 11th century.

The works of Sanskrit literature relating to the sciences and arts, grammar, lexicography, metrics, poetry, rhetoric, philosophy, law, astronomy, mathematics, medicine, music, painting, sculpture, and the technical arts, cannot come within the scope of this article. For works of reference, see under VEDIC.

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Sansovino, sām-sō-vē'nō, Andrea, Italian sculptor: b. Monte San Savino, near Montepulciano, 1460 (whence he was familiarly known as SANSOVINO, his real name being CONRUCCI); d. 1529. He was a pupil of A. Pollaiuolo and early formed his style on that of Leonardo da Vinci. It was under their influence that he produced

such reliefs as the 'Coronation of the Virgin'; 'The Annunciation'; and the 'Pietà.' In 1491 he was summoned by the king of Portugal to Lisbon where for nine years he exercised his art as sculptor and architect. Returning to Florence in 1500 he carved the group of 'Christ's Baptism' over the east portal of the Baptistery, which exhibited a nobility of form and expression unparalleled at that period, although he never completed the group. A statue of the Madonna and one of John Baptist for the cathedral at Genoa were his next works, and afterward he accepted a commission from Pope Julius III. to execute the tombs of Cardinals Basso and Sporza for the choir of Santa Maria del Popolo. In these sepulchral monuments we see that the high-water mark of the 15th century art is reached; they are the most masterly sculptures of their kind that Rome possesses. In 1512 he completed his 'Saint Anne with Two other Saints' in the church of San Agostino in Rome. He was then entrusted by Pope Leo X. with the decoration of the church at Loreto (1513-29). Among the reliefs there the 'Annunciation'; the 'Nativity'; and the statue of 'Jeremiah' are his own works; the rest of the decorations were produced under his direction by various artists. Nothing can be finer than the blending of classic severity with the freshness of Renaissance life in these figures which exhibit the results of a pure study of nature. Expression and action are full of deep feeling, yet not so emphasized as to overstep the line of modesty.

Sansovino, Jacopo Tatti, Italian sculptor and architect: b. Florence 1479; d. Venice 27 Nov. 1570. He took his name from the great artist who had been his teacher, and began his career in Florence where his first works of note were his statue of 'Jacob' in the cathedral and his marble 'Bacchus' in the Bargello. Belonging also to this early period is a 'Madonna and Child' in the church of San Agostino at Rome. In 1527 he went to Venice where his genius being quickly recognized he was appointed architect to the Republic. His untiring labors from that time to his death have left his stamp both on the sculptural and architectural monuments of Venice. He is a brilliant example of the Italian artist in the noonday splendor of the Renaissance and in his architectural creations unites play of fancy and elegance of proportion with the most impressive and monumental dignity. His preëminence as a sculptor is not so evident; his plastic work is often unpleasing and evidences a failure to master either the principles or the materials of his art, so that his work appears mannered and mechanical. His greatest successes in architecture are the Corner Palace (1532); the library of Saint Mark's, a splendid example of Italian Renaissance (1536); the Mint; and the churches of San Martin, San Giorgio dei Greci and San Giuliano. The 'Burial of Christ' and the 'Resurrection,' are fine reliefs on the bronze doors of the Sacristy of Saint Mark's, and among other plastic works of his are a sitting figure of 'Saint John' in Santa Maria dei Frari; the statues of 'Hope' and 'Love' on the tomb of the Doge Venier in San Salvatore; and the gigantic figures of 'Mars' and 'Neptune' in the Doge's palace. Consult: **Rosenberg** in Dohme's 'Kunst und Künstler.'

Sant, James, English painter: b. Croydon 1820. He was a pupil of John Varley and Sir Augustus Calcott, and studied in the schools of the Royal Academy for four years. As a portrait painter he has been eminently successful and was appointed during the last reign Painter-in-Ordinary to Queen Victoria. Among his best-known and most popular pictures are 'Little Red Riding Hood'; 'Infant Samuel'; 'The Boy Shakespeare'; 'The Walk to Emmaus'; etc.

Santa Ana (săn'tă ā'nā) **Indians**, a Pueblo tribe of New Mexico. See **QUERES**.

Santa Ana, Cal., city, county-seat of Orange County, on the Southern Pacific and the Southern California R.R.'s; 30 miles southeast of Los Angeles. It was founded in 1869. It is the commercial centre of Santa Ana valley, one of the most fertile sections of California; oranges and fruits of all kinds, vegetables, wheat and sugar beets are produced in this region, and there are also large peat-beds in the vicinity. The principal industries include a fruit and vegetable cannery, flour mills, large lumber and planing mills, and soda-works. Santa Ana is connected by a local railway with Newport Beach, 10 miles distant, a popular seaside resort. There is a public high school, established in 1889, and a public library; the Orange County Business College is also located here. The city owns its waterworks, the supply being derived from artesian wells. Pop. (1890) 3,628; (1900) 4,933; (1910) 8,429.

Santa Ana, Philippines, formerly a pueblo of the province of Rizal, constituted a district of the city of Manila in 1902. It is the centre of extensive vegetable gardening for Manila markets. Pop. 2,200.

Santa Anna, săn'tă ā'nā, or **Ana, Antonio Lopez de**, Mexican general and politician: b. Jalapa 21 Feb. 1795(?); d. Mexico City 20 June 1876. He entered the army at 15, and attained public prominence as a supporter of Iturbide in 1821. The following year, after having expelled the royalists from Vera Cruz, he took command in that city, where he led a revolt (2 Dec. 1822) which hastened the retirement of Iturbide, who had made himself emperor. After the defeat of the Federal party in 1823 Santa Anna retired to his estate; but he emerged again in 1828 in support of Guerrero's claims to the presidency, in which the latter supplanted Pedraza. In 1829 the Spanish invasion furnished Santa Anna a favorable opportunity, and as minister of war and commander-in-chief at the head of the Federal forces he compelled Barradas to capitulate at Tampico, 11 September. He soon joined with Bustamante in overthrowing Guerrero, and setting up the former in his place, but also, in 1832, led in the overthrow of Bustamante himself, and the restoration of Pedraza. In 1833 Santa Anna was chosen president, and soon after renounced the party of the Federalists and put himself at the head of the Centralists, who desired the centralization of power in the executive government. His popularity with the army was not shared in by the nation at large, which feared that he was aiming at imperial power. On 11 May 1835 he defeated an insurgent army on the plains of Guadalupe, and as the blow was fatal to the republicans he was shortly afterward named dictator. The Federal constitution was abolished.

SANTA BARBARA — SANTA BARBARA ISLANDS

and the governors of the several states became dependent upon the central power. Texas, however, having long nourished a revolutionary feeling, now broke out into rebellion. Santa Anna attacked San Antonio in February 1836, stormed the Alamo (q.v.), and massacred its defenders, 6 March, and going forward pursued the Texans under Sam Houston (q.v.), by whom, however, 21 April, at the battle of San Jacinto (q.v.) he was routed and taken prisoner. He secured his release by a treaty recognizing the independence of Texas, which, however, was repudiated by Mexico, that country also suspending his dictatorship. He was permitted to go to the United States, and after his return to Mexico in 1837 lived in retirement for a year, but offered his services to his country against the French in 1838, and taking command of the troops, repelled the assault on Vera Cruz (5 December) and forced the enemy to retire. In this engagement he lost a leg, a casualty which, however, contributed to restore him to popular favor. He again became a leader of the Centralists, and from October 1841 to June 1844 was virtual dictator under the title of president. The new constitution of 12 June 1843, under which he was formally elected president, increased his dictatorial powers, the exercise of which led to a fresh revolution, resulting in his overthrow. He was taken prisoner in January 1845 and banished. But on the eve of the war with the United States, he was recalled (July 1846), and was first appointed generalissimo by the provisional government and in December was made provisional president. At the opening of 1847 he led an army of 20,000 against the American troops under General Taylor, and fought the battle of Buena Vista (q.v.) 22-23 February, in which he was defeated. On 18 April he was attacked and defeated at Cerro Gordo (q.v.) by General Scott. Immediately after the battle of Chapultepec (q.v.) the City of Mexico fell and was entered by the Americans (14 September). Santa Anna, escaping from the city, briefly continued a desultory warfare; but on 5 April 1848, having resigned the presidency, he received permission to retire from the country and sailed for Jamaica, going thence to Venezuela. In 1853 he was recalled and elected president for one year, but after setting up an odious despotism, he proclaimed himself (December 1853) president for life, with the title of Serene Highness and the right of nominating his successor. Revolution followed in March 1854, and when he saw that his cause was lost Santa Anna fled from the capital (9 Aug. 1855) and found refuge in Cuba, Venezuela, and Saint Thomas. In this absence he was tried and condemned for treason, and his estates were confiscated. He returned to Mexico during the French occupation (1864), but was not permitted to remain. In 1867 he again returned, but was once more exiled and went to live in the United States. Finally, after the death of Juarez and the amnesty of 1874, he was permitted to reside in his own country, where his career ended in poverty and obscurity. Consult: Wilson, 'Mexico' (1856). See MEXICAN WAR; MEXICO; TEXAS.

Santa Barbara, bār'ba-ra, Cal., city, county-seat of Santa Barbara County; on Santa Barbara Channel, an arm of the Pacific Ocean; and on the Southern Pacific railroad; about 360 miles southeast of San Francisco. It has

regular steamer communications with San Francisco, San Pedro, San Diego, and other Pacific ports. The Santa Ynez Mountains shelter the city from the north winds, and the ocean breezes serve to make the temperature equable and salubrious all the year. The number of health seekers who visit the place in winter has given it the name "American Mentone." It was visited, in 1603, by Sebastian Vizcaino. In 1782, Governor Felipe Neve established a presidio which was maintained until the arrival of General Frémont.

Santa Barbara is in a remarkably fertile agricultural region, and has important interests in stock-raising, fruit growing, and in the shipment of olive oil, petroleum, wool, and various minerals. In the vicinity are mineral springs which are noted for their medicinal properties. The excellent bathing places are not the least of the attractions. In the city and around, the roses are conspicuous, often covering the houses. Four miles distant, at Montecito, is the great grape vine, the Parra Grande, which yields annually 8,000 pounds of fruit. The broad fields of pampas grass, the groves of walnut, olive, orange, prune, and other trees, the long avenues of magnolias, the great leaved bananas, the tall calla and other flowers which cover the fields in profusion, seem to vie with clear skies in making Santa Barbara an ideal residential city. The educational institutions are Santa Barbara Collegiate School, a high school, public and parish graded schools, several private schools, manual training schools, kindergartens, and three libraries. In connection with Saint Vincent's orphanage is a school. The four banks have a combined capital of \$260,000. Within a mile of the city is the place where the Spanish priest Junipero Serra founded a mission in 1786. There are still standing and in use by Franciscan monks, his church with its two towers, the refectory, the dormitory, and the quaint old garden. Pop. (1910) 11,659.

Santa Barbara, Honduras, the capital of the department of Santa Barbara, situated on the Santa Barbara River, 65 miles southwest of Puerto Cortés. It is a comparatively well built town, manufactures sombreros and spirits, and is a commercial depot for the products of the surrounding country destined for Puerto Cortés. The latter is reached by a high-road and, for a part of the way, by rail. Pop. between 5,000 and 8,000.

Santa Barbara, Philippines, pueblo, province of Iloilo, island of Panay, between a branch of the Janipa River on the north and the Tigón River on the south, 12 miles north of Iloilo, the provincial capital. Pop. 13,000.

There is also a smaller pueblo of the same name, province of Pangasinán, Luzon, 12 miles east of Lingayén; at the crossing of two roads. Pop. 7,595.

Santa Barbara, a channel, or arm of the Pacific Ocean, between the northern islands of the Santa Barbara group and the mainland of California. It varies in width from 20 to 30 miles.

Santa Barbara Islands, a group off the coast of California; about 20 miles distant from and nearly parallel with the mainland coast. They are nine in number; San Miguel, Santa Rosa, Santa Cruz, Anacape, Santa Barbara,

SANTA BARBARA DE OCAMPO — SANTA CRUZ

Santa Catalina, San Clemente, San Nicolas, and San Juan. From San Miguel on the north to San Clemente is about 175 miles.

Santa Barbara de Ocampo, dā ō-kām'pō, Mexico, a town in the state of Tamaulipas, situated 45 miles south of Ciudad Victoria. It lies in a fertile river-plain at the foot of the eastern Sierra Madre, and is the centre of a rice, sugar and fruit-growing district. Pop. about 10,000.

Santa Catalina, kā-tā-lē'nā, an island of California, one of the Santa Barbara Islands; separated from the mainland by San Pedro Channel and Gulf of Santa Catalina. The island was discovered in 1542 by Juan Rodriguez Cabrillo, a Portuguese explorer in the service of Spain, and was named by him San Salvador. The explorer Sebastian Vizcaino visited the island 60 years later and gave it the present name, in honor of Saint Catharine of Sienna. The island is 25 miles long, with an average width of four miles; area, about 55,000 acres. It is hilly and well-wooded and has many deep gorges. Avalon (q.v.) is the only town on the island. The surrounding waters abound with fish. The island is a favorite resort, especially from June to October.

Santa Catharina, kā-tā-rē'nā, Brazil, a southern maritime state bounded on the north by the state of Paraná, on the east by the Atlantic, on the south by the state of Rio Grande do Sul, and on the west by the Argentine territory of Misiones; it includes the fortified island of the same name and several smaller ones on the coast; area, 28,620 square miles. Desterro (q.v.), officially Florianópolis, is the capital. A series of valleys run west to east, formed by spurs of the boundary mountain range, and the state is watered by the rivers São-Francisco, Aracary, Tapeçu, Tijuca, Tubarão and numerous streams all falling into the Atlantic. The soil, though in the lower lands sometimes sandy, is fertile, the climate mild, and the seasons regular. Sugar, rice, mandioca, millet, beans, onions of immense size, and garlic are the chief cultivated products, considerable quantities of which are exported to Rio de Janeiro. The indigo and cochineal plants grow spontaneously, and wheat and flax give good returns. The state is well wooded, producing excellent timber and gold, silver, iron, coal, and petroleum exist. The forests are infested by ounces, coatís, monkeys, pigs, and other animals. Birds are numerous, including several varieties of humming-birds; and the lakes and rivers are frequented by innumerable geese and other water-fowl. Population (est.) 350,000, including 50,000 Germans.

Santa Clara, klā'rā, Cal., town in Santa Clara County, on the Southern Pacific railroad, 40 miles southeast of San Francisco. It was settled by the Franciscans in 1777, became a town in 1852, and received a new charter in 1867. It is the centre of a rich agricultural and fruit-raising region, and has a number of fruit-packing establishments; it also contains several mills and a tannery. It is connected with San José, the county-seat, by a narrow-gauge railroad and electric street railway. The public school system includes a high school, and there is a public library. The town is also the seat

of Santa Clara College, a Roman Catholic institution founded in 1851, and the Notre Dame Academy, a Roman Catholic convent school, and the University of the Pacific (q.v.) is nearby. The government is by a board of five trustees, three of whom are elected every two years. Pop. (1890) 2,891; (1900) 3,650; (1910) 4,348.

N. H. DEMING,

Editor Santa Clara 'Journal.'

Santa Clara, Cuba, (1) City, capital of the province of Santa Clara; on the Cuba railroad; 155 miles east-southeast of Havana. It was founded in 1689. Formerly it was the eastern terminus of the railroad from Havana, but in 1902 the railroad system was extended to the eastern end of the island. It is the centre of a fertile agricultural region, is the second largest inland city of Cuba, and has considerable commercial importance, which is increasing with the development of the railroad facilities. Silver has been mined in the vicinity, but not successfully; an excellent quality of asphalt is obtained and exported; and illuminating gas for lighting the city has been manufactured from this asphalt; petroleum is also reported in the vicinity. The city is well built, the streets are wider than is usual in the older Cuban cities, and municipal sanitation has been improved since 1898. The location is naturally healthful and favorable for further commercial development. Pop. about 17,000.

(2) Province in the central part of Cuba, bounded on the east by Puerto Principe and on the west by Mantanzas; area, 9,560 square miles. The surface is undulating, with ranges of hills in the east and south, the highest peak rising 2,900 feet. It has rich agricultural lands; the production of sugar is the chief industry, the province containing some of the largest sugar plantations and factories in the island. Tobacco, coffee, and fruits are other products of commercial importance; wax and honey are obtained; and the timber is abundant and valuable, there being 307,910 acres of public forests in the province. There are also excellent grazing grounds and cattle raising is a profitable industry. The mineral resources are second only to those of the province of Santiago de Cuba, but not so well developed; asphalt, copper, gold and silver are found. The Cuba Railroad traverses the province from east to west, and there are short branch roads; there are few good highways, however, and the need of improvement in transportation facilities is felt. Pop. about 460,000.

Santa Clara, Order of. See ORDERS, ROYAL.

Santa Claus, sän'tā klāz. See NICHOLAS, SAINT.

Santa Croce, sän'tā krō'chā. See FLORENCE.

Santa Cruz, sän'tā kroos, Andres, Bolivian soldier and politician: b. La Paz, Bolivia, about 1794; died Saint Nazaire, France, 1865. He was of partial Indian descent, entered the Spanish army and rose to the rank of colonel. He was captured by the patriots in 1820, persuaded to adopt their cause, became a general in the army, and led an invasion of Upper Peru in 1823. In 1826-7 he was acting president of Peru under Bolivar and in 1829 he was elected president of Bolivia for a term of 10 years, receiving also the title of grand marshal. His measures were progressive and the country en-

SANTA CRUZ—SANTA CRUZ DE LA SIERRA

joyed great prosperity under his administration. From the first he adhered to his purpose of uniting the Pacific coast republics, and his successful invasion of Peru in 1836 was followed by his proclamation of the Peruvian-Bolivian confederation. In 1839 a Chilean army invaded Bolivia and defeated Santa Cruz at Yungay. He resigned and left the country, whereupon the confederation was dissolved. He was afterward engaged in Europe on various diplomatic missions for Bolivia.

Santa Cruz, sán'ta krooz, Cal., city, county-seat of Santa Clara County; on the Bay of Monterey, and on the Southern Pacific and South Pacific Coast R.R.'s; 60 miles south of San Francisco. It was first settled in 1791 by Franciscan missionaries, and was incorporated as a city in 1876. It is in a fruit-raising region; the chief manufacturing establishment in the city is a powder factory; other manufactures of importance include lead, bitumen, and leather; and there are also lumber and planing mills, a soap factory and a box factory. The city is beautifully situated on land rising gradually from the bay, the climate is equable and pleasant, and it has become one of the most popular health and tourist resorts of central California. A bathing beach, picturesque drives, and a large public park overlooking the bay add to the attractions of the place. The public buildings include a court-house, a hall of records, the city-hall, and the public library. The city has a public high school and parochial schools; and is the seat of the School of Holy Cross (a Roman Catholic convent school), and of the Catherwood's Business College (coeducational). The city is governed on the commission plan, being one of eight cities so governed in California. Pop. (1910) 11,146. Z. BARRET,

City Editor of 'The Sentinel.'

Santa Cruz, sán'ta kroos, Mexico, a town in the state of Guanajuato, situated in a fertile agricultural district a few miles southeast of Guanajuato.

Santa Cruz, Philippines, pueblo, capital of the province of Laguna, Luzon; on southeast shore of the Bay Lagoon (Laguna de Bay), at the mouth of the Santa Cruz River; 34 miles southeast of Manila. It is connected by highway with Manila, Batangas, Cavite, and Tayabas, and carries on an important trade. It is also the terminus of a projected railroad from Manila. The region is famous for the manufacture of palm wine or brandy, the sale of which was a government monopoly under Spanish rule. The town is well built and contains fine municipal and ecclesiastical buildings. Pop. 13,140.

There are also three smaller pueblos of the same name: (1) Pueblo, province of Dávao, Mindanao, on Dávao Bay, 15 miles south of Dávao; it has an excellent harbor of good depth; pop. 720; (2) pueblo, province of Ilocos Sur, Luzon, 34 miles south of Vigan; on the main highway; pop. 5,876; (3) pueblo, province of Zambales, Luzon, on sea-coast; 32 miles north of Iba; on the main highway; pop. 4,600.

Santa Cruz, sán'ta krooz, or **Saint Croix**, sánt kroi, the largest of the Virgin Islands, Danish West Indies, lying 60 miles southeast of Porto Rico; area 84 square miles. It is hilly,

except in the southern part; well-watered, and fertile, and has a larger proportion of land under cultivation than the other islands of the group. Sugar is the chief product; tobacco, cotton, and fruits are also cultivated. Some cattle are raised. The chief articles of export are sugar and rum. The climate is at times unhealthy, the temperature varies from 54° to 72°. Earthquakes and hurricanes are frequent. The capital and residence of the governor is Christianstadt; and in the island is another small town called Frederikstadt. The island was discovered by Columbus in 1493, and was occupied by the Dutch, the English, the Spaniards, and the French; ceded to Denmark by France, it was occupied by the English in 1807, but finally restored to Denmark by the Treaty of Paris. It was included in the treaty of 1902 for the purchase of the Danish West Indies by the United States, which was rejected by the legislature of Denmark. Pop. about 20,000. See WEST INDIES, DANISH.

Santa Cruz Islands, or **Queen Charlotte Islands**, Melanesia, an archipelago in the Pacific Ocean, belonging to Great Britain, and situated in lat. 10° S. and lon. 166° E., north of the New Hebrides, and east of the Solomon Islands. The group comprises several large and a number of small islands, with a combined area of 362 square miles. The larger islands are volcanic and mountainous. Most of them are surrounded by coral reefs, and nearly all the small islands are of coral formation. The climate is hot, humid and unhealthful, but the soil is very fertile, and the vegetation luxuriant. The inhabitants, who are chiefly Melanesians and still uncivilized, are supported partly by their plantations of coco-palms, partly by fisheries and by trading with neighboring islands. The archipelago was discovered in 1595 by Mendana. Since 1898 it has been an administrative dependency of the Solomon Islands. The population is about 7,000.

Santa Cruz de Napo, sán'ta krooth dá nā'pō, pueblo, province of Marinduque, Philippines, on the northeast coast, 18 miles east of Boac. The town lies about a mile and a half from the shore, and three miles from the anchorage ground. It is a port of entry for coasting vessels, and the anchorage is well protected; there is difficulty, however, in landing at the point nearest the town. Santa Cruz is surrounded by a fertile agricultural country; it is not as well built as Boac, the provincial capital, but its situation is more advantageous owing to the superior harbor. Pop. 15,800.

Santa Cruz de la Sierra, sán'ta kroos dá lā sē-ēr'rá, Bolivia, (1) Town, capital of the department of Santa Cruz de la Sierra; on the Piray River, on the eastern slopes of the Andes. The town was founded in 1575, and originally bore the name of San Lorenzo de la Fontera. The houses are mostly one story high, built with timber and earth, with large balconies and uneven roofs. (2) Department, the easternmost department of Bolivia, bounded on the north by the rivers Beni, Mamore, Itenez, and the Brazilian province Matto-Grosso; on the east by the river Paraguay and the Brazilian territory; on the south by the Pilcomayo and the desert of Gran Chaco; on the west by the departments Cochabamba and Chuquisaca; area, 126,346

SANTA CRUZ DE TENERIFFE—SANTA FE

square miles. It is mostly level, except in the western part, where it reaches the Andes. It is drained by the Rio Mamore and the Rio Beni, and their tributaries. The central region is mostly heavily wooded, with some open marshes and plains. It is thinly populated, the most of the towns being in the western part and along the rivers. The soil between the mountains and the central forests is fertile and yields sugar, coffee, cacao, and rice. Some cotton cloth is manufactured and gold is mined in the mountain district. Pop. (estimated) 209,850.

Santa Cruz de Tenerife, sán'tā krooth dā tén-ě-rif', Canary Islands, city, capital and commercial port of the Canary Islands, on the northeast coast of the island of Tenerife. Many of the houses are handsome, and of one and two stories high; but the majority are low. The streets are well paved, and lighted by electricity. There is a square, surrounded by wooden edifices, and adorned with a colossal statuary group representing the apparition of the Virgin of Candelaria to the Guanches, the original inhabitants. Besides the custom-house and the military hospital, there are scarcely any public buildings; the church of San Francisco is the finest. The harbor, which is very secure, has a magnificent mole, of modern construction; other works, including a breakwater, have recently been constructed. Tomatoes, bananas, potatoes, wine, brandy, and cochineal are the chief articles exported; and the imports consist largely of English, French, Spanish, and German manufactures, with coal, grain, flour, etc. Pop. 16,000.

Santa Fé, sán'tā fá, or **Santa Fé de la Cruz**, Argentina, (1) Capital of the province of the same name, near the junction of the Salado with the Paraná, 299 miles by rail northwest of Buenos Ayres. It stands on an eminence which is prominent in a district otherwise level. The Cabildo, the most important building, stands on the plaza or main square. Santa Fé is the seat of the governor, legislature, and the bishop. There are several churches and monasteries, also a normal school for teachers. Hides and timber form the chief articles of trade. The principal industrial works are: a foundry, macaroni and oil factories, and tile works.

(2) The province of Santa Fé covers 50,916 square miles, and has a rapidly increasing population. There are vast numbers of cattle, sheep, and horses on extensive farms, and 3,688,118 acres of land are planted in cereals. Pop. about 550,000.

Santa Fé (Holy Faith, contracted from **LA VILLA REAL DE SANTA FÉ DE SAN FRANCISCO**), New Mexico, city, capital of the Territory, and county-seat of Santa Fé County; on Santa Fé Creek, the Denver & R. G., the Santa Fé Central, and a branch of the Atchison, T. & S. R.R.'s, the latter connecting with the main line at Lamy, 18 miles southeast; it is 21 miles east of the Rio Grande, and 58 miles northeast of Albuquerque. Chartered as a city in 1890.

Principal Features.—The streets in the older part are narrow and crooked, and are occupied chiefly with one-story adobe houses, but in the more modern portion the streets are broad and straight and are improved with good business houses and neat residences, many of them of stone and brick. A public park, known as the

Plaza, occupies a square in the middle of the city, in which are two monuments and a memorial fountain. The city contains also a monument to Governor Perez, who was assassinated in 1837, and another to Kit Carson who lived at Taos. Santa Fé is the seat of a Roman Catholic archbishopric, and until 1897 the military post known as Fort Marcy was situated there. The city contains the oldest national bank in New Mexico (capital \$150,000), and has a public high school and four ward schools. In addition to the State library with 4,500 volumes, there are three public and school libraries with 5,300 volumes. An English daily, an English weekly, and two Spanish weeklies are published. The rooms of the New Mexico Historical Society contain interesting historical and archaeological collections. Santa Fé is beautifully situated at an altitude of 6,998 feet, in the midst of an agricultural and mining region, and its principal business consists of supplying the immediately surrounding country with merchandise. Water for domestic purposes, for local irrigation, and electric power, is supplied by reservoirs above the city on Santa Fé Creek. There are commodious hotels, but no street railways. Owing to its unsurpassed climate Santa Fé has become a popular resort for health-seekers, and its deep historical interest attracts many tourists; but as a business centre it has steadily declined since the building of the first railroad brought the overland trade via the Santa Fé trail to a close and diverted much traffic to Albuquerque. Pop. (1880) 6,635; (1890) 6,165; (1900) 5,603; (1910) 5,072.

Buildings, etc.—By reason of its long political and ecclesiastical importance Santa Fé contains by far the most interesting and some of the finest buildings in the Southwest. First in historical importance is the "Palace," a massive-walled, one-story structure of adobe, a block in length, and facing the Plaza on the north. (See illustration under **NEW MEXICO**.) It was doubtless erected early in the 17th century, and originally was square, with a large court in which the Spanish garrison was quartered. The building formed the headquarters of the Spanish and Mexican provincial governments successively until 1846, when Gen. Kearny took possession of New Mexico for the United States. Diego de Vargas, the reconqueror of New Mexico in 1692, and Zebulon Montgomery Pike (after whom Pikes Peak was named), with many others of note, were imprisoned therein, and Gen. Lew Wallace finished his 'Ben Hur' in one of its rooms while governor of the Territory. Next in importance, perhaps, is San Miguel Church, a plain adobe structure, largely destroyed by the Indians in 1680, restored in 1710, and greatly modified within recent years. The cathedral, a fine modern sandstone edifice, is built around a parish church known as the Parroquia, which was probably erected on the site of a still older church, built by Fray Alonzo de Benavides in 1622-7, but destroyed in the revolt of 1680. The Cathedral contains handsome carved stone reredos originally erected in the former Capilla de los Soldados (built in 1730 on the south side of the Plaza) by Governor Marin del Valle and his wife in 1761. Of interest also in the history of Santa Fé are the Rosario Chapel, said to occupy the spot where Vargas made his vow before the surrender of

SANTA FE TRAIL—SANTA MARIA

the city in 1692; the Garita, formerly a military outpost at which the leaders of the rebellion of 1837 were executed, and long the site of a cemetery; the earthworks of Old Fort Marcy, north of the city, erected during the Mexican War; and an ancient dwelling mistakenly believed to antedate the Spanish conquest. The State Capitol, of brick and stone, completed in 1900, at a cost of \$200,000, is an attractive building. There are also a Federal building, a State penitentiary (cost \$150,000), a county court-house, Saint Vincent's Hospital, Saint Vincent's Sanatorium, Saint Vincent's Orphanage, an Industrial School for the Deaf and Dumb, the Allison Presbyterian Mission (opened 1881), the Government Indian School with 300 pupils, Saint Catharine's Indian School (R. C.), San Miguel College (R. C.), and Loretto Academy (R. C.). Besides the cathedral there are two other Roman Catholic churches, a Protestant Episcopal church, an English and a Spanish Presbyterian church, and an English and a Spanish Methodist Episcopal church.

History.—Santa Fé was established, on the site of at least one prehistoric Indian pueblo, by Juan de Oñate in 1605; it is therefore the second oldest white settlement in the United States, Saint Augustine, Fla., alone exceeding it in point of age. (See *NEW MEXICO*.) The prospects of the town during its first few years were not encouraging. In 1617, there being only 48 colonists and soldiers in the province, which was surrounded by predatory tribes, the king, in response to an appeal for aid, rendered the desired succor, and by 1630 Santa Fé contained 250 Spanish inhabitants. In 1623 Fray Alonso de Benavides, custodian of missions, began the erection of a church, which was finished five years later, probably on the site of the present cathedral (see above). On 10 Aug. 1680 the Pueblo Indians, led by a native named Popé, arose in rebellion against the Spaniards, killed 400 of the 2,500 colonists, soldiers, and priests, and laid siege to the capital until the 20th, when Governor Otermín and a thousand survivors who had taken refuge in the Palace, made a sortie, killing 300 of the Indians and capturing 50, who were afterward hanged, and on the following day started on a long overland journey to El Paso, Texas. Santa Fé remained in possession of the Indians until September 1692, when Governor Vargas recaptured the town with but little opposition, and late in the following year it was resettled with about 800 new colonists. Hostilities were renewed during the winter, but the Indians were soon overpowered and 70 of the participants hanged in the Plaza. There were several proposals to move the seat of the provincial government in the 18th century, but nothing was accomplished. French-Canadian trappers found their way to the Rio Grande by the middle of the century, followed by a brisk trade between New Mexico and Chihuahua, and, early in the 19th century, between the province and the American frontier, Santa Fé being the western entrepôt. This trade, which became known as the "commerce of the prairies," was conducted over the Santa Fé trail, first from Kaskaskia, Ill., later from Franklin and Independence, Mo., and increasing from \$15,000 in 1822 to \$750,000 in 1844. During the rebellion of 1837 Gov. Pérez, the chief justice, and other officials were

killed, and a Taos Indian installed as Governor, but he was succeeded in 1838 by Manuel Armijo, who thwarted an attempt by 300 Texan rangers to invade Santa Fé in 1841. On 18 Aug. 1846 Gen. S. W. Kearny took possession of the town in the name of the United States, issuing a proclamation to that effect on the 22d. An adobe fort and blockhouse were erected on the northern heights and named in honor of Secretary of War Marcy, and under its embankments 200 Missouri volunteers were buried during the winter of 1846-7. Charles Bent, the first American civil governor, was murdered at Taos in January 1847; in the same year the first legislative assembly was held at the capital, the first newspaper was established, and a saw-mill erected. In 1848 the treaty of peace with Mexico was proclaimed from the Palace, the *New Mexican* (still published) was founded, and the Roman Catholic vicariate-apostolic of Santa Fé was established. New Mexico becoming organized as a Territory of the United States 3 March 1851, Santa Fé was established as its seat of government on 14 July. On 3 March 1862, during the Civil War, Santa Fé was abandoned by Union forces and occupied a week later by Confederates, but it was again evacuated on 8 April and occupied by the Federals on the 11th. The first railroad entered Santa Fé 9 Feb. 1880.

F. W. HODGE,

Smithsonian Institution, Washington, D. C.

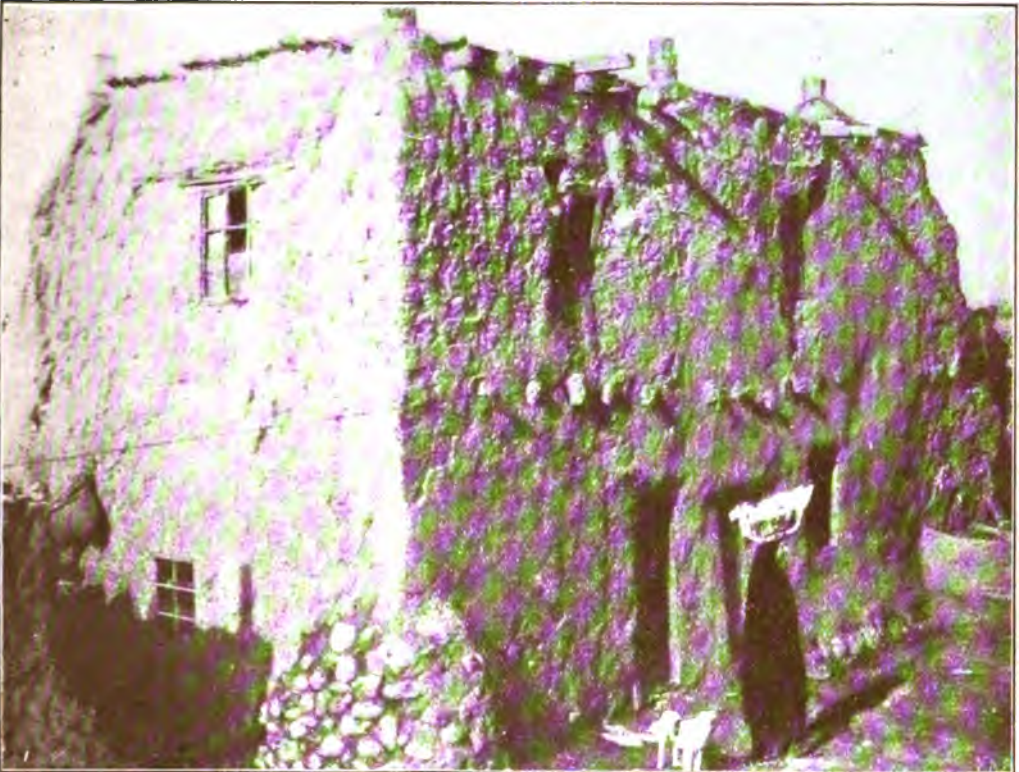
Santa Fé Trail, The. See **ROADS AND HIGHWAYS**.

Santa Fé de Bogotá, *dā bō-gō-tā'*, and **de Guanajuato,** *dā gwā-nā-hoo-ā'tō*. See **BOGOTÁ** and **GUANAJUATO**.

Santa Maria, *mā-rē'ā*, **Domingo,** Chilean politician: b. Santiago, Chile, 4 Aug. 1825; d. there 1890. He was graduated from the University of Santiago, admitted to the bar in 1847, interested himself in political matters, and in 1851-2 was involved in an insurrection which caused his banishment for a year. On his return he was elected to congress, made a reputation as an orator, and in 1858-9 was again banished. He was minister of finance under Pérez in 1863-4, and in 1868 was appointed to the supreme court. He afterward served as minister of foreign affairs, of the interior, and of war under Pinto, and gained great popularity by his measures during the war with Bolivia and Peru. He was elected president in 1881 for a term of five years, successfully terminated the war, subdued the Araucanian Indians, and by his able administration of affairs retained his popularity throughout his term of office. He was afterward president of the senate.

Santa Maria, Philippines, (1) Pueblo, province of Ilocos Sur, Luzon, 15 miles south of Vigan. It is on the main highway, and several cart roads lead from here to the interior. In December 1900, 2,150 insurrectionists surrendered here, and took the oath of allegiance to the United States. Pop. 10,030. (2) Pueblo, province of Zamboanga, Mindanao, also called **BIASONGAN**, on the western sea-coast at the mouth of a river; 56 miles north of Zamboanga. It has a well-sheltered harbor. The surrounding region is heavily timbered with valuable woods, and one of the largest saw-mills in the southern Philippines has been erected here.

SANTA FE.



1. The so-called "oldest dwelling house in the United States."
2. The old Palace at Santa Fe.

SANTA MARIA DE PANDI—SANTANA

Two smaller pueblos have the same name: (1) pueblo, province of Pangasinan, near the Agno River, 32 miles east of Lingayen; pop. 3,940; (2) pueblo, province of Zamboanga, Mindanao, in the extreme southwest, 3 miles northwest of Zamboanga, the provincial capital; pop. 2,200.

Santa Maria de Pandi, *dā pān'dē*, Philippines, pueblo, province of Bulacán, Luzon; on the Santa Maria River, three miles from its mouth; six miles northeast of Bulacán. It was almost entirely destroyed during the insurrection, as it was the military centre of the insurrectionists, and was burned by American troops; it is, however, being rebuilt. It is in a productive rice and fruit region, has good roads, and is near Manila and the Manila & Dagupan railroad; there are also facilities for river transportation. Pop. 10,510.

Santa Marta, *mār'tā*, Colombia, capital of the department of Magdalena, stands on the north coast near the mouth of the Magdalena River. The surroundings are attractive but not salubrious. It has a good harbor, is an episcopal see, and has a noteworthy cathedral. Pop. 6,000.

Santa Maura, *mow'rā*, or *Leucadia*, Greece, an island of the Ionian group off the western coast, from which it is separated by a canal. It covers an area of about 180 square miles, is mountainous, the ranges running north and south and terminating in the white cliffs from which the island derives its name. The eastern portion is unproductive; the west and north are fertile, producing vines, pomegranates, olives, citrons, almonds and some corn. The chief source of wealth consists in the bay-salt, about 8,000 tons of which are exported annually. Bee-culture is carried on, but agriculture is the principal industry; navigation and fisheries also occupy a considerable number of the inhabitants. Cape Ducato (*q.v.*), formerly Leucates, at the extremity of the peninsula on the southwest, is the high rock (200 feet) where once stood a temple of Apollo, also known as Sappho's or the Lover's Leap. It was also the scene of several early Grecian tragedies. Amaxichi is the principal town, on the northeast, with about 6,000 inhabitants. Nearby is the fortress of Santa Maura.

Santa Rosa, *rō'zā*, Cal., city, county-seat of Sonoma County; on Santa Rosa Creek, and on the California Northwestern and the Southern Pacific R.R.'s; about 60 miles north by west of San Francisco. Settlements were made in the vicinity about 1850, but the place was not laid out nor incorporated until 1854. It received its name partly from the profusion of roses which are found here all the year. It is in a most productive agricultural region noted for its fruits, vegetables, grain, and hops. It has also large stock-raising interests, and considerable attention is given to dairying. The chief industrial establishments are large fruit drying and canning works, flour mills, machine shops, soap factories, a brewery, and carriage works. The principal public buildings are the county court-house, jail, city buildings, 10 churches, and the educational institutions. The court-house and the other county buildings cost originally \$200,000. The Baptist Church was built entirely

from the timber of one of the giant redwood trees from the Guerneville forest, all of the lumber being supplied by the one tree. Many trees shade the broad streets, which are clean and well kept. The surface of the city is almost level.

The educational institutions are a high school, the Ursuline Academy, Santa Rosa Ladies' College, the Pacific Methodist College, opened in 1861, public and parish schools, several private schools, and a library. The four banks have a combined capital of \$770,000. The water-supply is excellent, a gravity water-system being in use. The government is vested in a mayor and council. Pop. (1910) 7,817.

Santa Rosa, *rō'sā*, Philippines, pueblo, province of Laguna, Luzon; on the west shore of the Bay Lagoon; 20 miles west of Santa Cruz. It is on the main road and on the line of a projected railroad. Pop. 9,450.

Santa Rosa, Order of. See ORDERS, ROYAL.

Santa Rosalia, *rō-sā'lē-ā*, Mexico, a town in the southern part of the state of Chihuahua, on the Mexican Central Railroad. It is noted for its hot sulphurous springs. Pop. about 8,000.

Santa Tecla, *tāk'lā*, or *Nueva San Salvador*, Salvador, a city situated a few miles southwest of San Salvador. It is built amid romantic surroundings at the southern base of the capital. When the latter was destroyed by an earthquake in 1854 an unsuccessful attempt was made to remove the seat of government to Santa Tecla. The city is connected by a highroad with the port of Libertad, and has a thriving commerce. Pop. about 14,000.

Santal Parganas, *sān-tāl' par-gūn'as*, India, a district in the Bhagalpur division of Bengal, bounded on the north and partly on the east by the Ganges. Area 5,456 square miles. Pop. 1,755,000. The capital is Dumka. The district is named from the Santāls, who form the most characteristic portion of its inhabitants, and are also found elsewhere in India. They are one of the aboriginal races belonging to the Dravidian stock, are dark-colored, and mostly profess a religion of their own, in which the worship of a chief deity and subordinate deities and a sort of ancestor worship play a chief part. They live chiefly by hunting, and are exceedingly fond of flute-playing, dancing, and singing.

San'tals, or Santhals. See SANTAL PARGANAS.

Santana, *sān-tā'nā*, **Pedro**, West Indian soldier and politician: b. Hineha, Santo Domingo, 29 June 1801; d. there 14 June 1864. He was a lawyer and a wealthy land-owner living quietly on his estates until 1844 when the Dominicans revolted against Haiti. He joined their cause, was appointed brigadier by the junta, and speedily rose to the chief command of the insurgent army. He was elected president for four years in November 1844 and administered the affairs of the government with great success, endeavoring to promote agricultural interests and to increase the resources of the country. In 1849 he was called to the command of the army, defeated the invader Souloque, deposed President Jimenes and ruled as dictator until the election of President Baez in October 1849. He was re-elected president in 1853, and again

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repulsed the invasions of Soulouque in 1855 and 1856. He resigned in 1857 and was succeeded by Baez, but after the revolt of 1858 again assumed the government. He had strongly favored annexation to the United States in 1849 but the movement had been defeated by Baez, and now, in despair of bringing the government to a satisfactory basis, he ceded it to Spain. He was given rank as lieutenant-general in the Spanish army and retired to his estates, but when the insurrection against Spanish authority broke out he marched to Azua, where he at once crushed the rebellion. When, however, the insurrectionary spirit became general he again retired to his estates where he died shortly before the end of Spanish rule. His last days were embittered by the hatred of many of his countrymen who regarded him as a traitor, but he is now generally recognized as a thoroughly honorable and upright man who acted solely from disinterested motives, while his courage is held unquestioned even by his enemies.

Santander, sãn-tãn-dâr', **Francisco de Paula**, Central American soldier and statesman: b. Rosario de Cúcuta, New Granada, 2 April 1792; d. Bogotá 5 May 1840. In 1810 he engaged in the war for independence, fought in the ensuing campaign, in 1817-18 was with Bolívar, and assisted the Liberator to gain the battle of Boyacá (7 Aug. 1819). For his services he was promoted general of division. In 1821 he was elected to the vice-presidency of Colombia, with Bolívar as president. While the latter was absent in the southern Isthmus and Peru (1822-7), he administered the government with much ability. Re-elected in 1827, he became the leader of the opposition to Bolívar, and when the latter (1828) arrogated to himself dictatorial powers, Santander was deposed, and sentenced to death on an unsupported charge of attempted assassination of the dictator; and though the sentence was later commuted to exile, he was deprived of all rank. The Colombian republic ended in 1831, Santander was elected president of New Granada in 1832, and after the close of his term (1837), served also in the congress. His administration was one of order and progress, and laid the basis of the republic of New Granada, the modern Colombia. He was among the wisest leaders of the time, and wrote a justification of his political course in 'Apuntamientos para las Memorias de Colombia y Nueva Granada' (1837).

Santander, Colombia, a department situated in the north central part of the country, between Venezuela and the Magdalena River. Area about 16,000 square miles. The greater part is occupied by the eastern cordillera of the Colombian Andes, which runs lengthwise through the department. The range is cut near the middle by the deep valley of the Sogamoso River. Only the uplands are inhabited; the lowland along the Magdalena is an unhealthy and densely forested wilderness. The chief products are sugar, coffee, cocoa, tobacco and cotton. The mountains, however, are rich in minerals including iron, copper and coal. Pop. estimated at 555,600.

Santander, Spain, (1) Capital of a province of that name, and one of the chief ports of the Peninsula, 207 miles by rail north of Madrid,

near the Bay of Biscay. The principal modern buildings are the town-hall, theatre, market, barracks, bull-ring, clubs, civil and military governors' residences, the Institute and other schools, custom-house and hospitals. There are numerous open squares and magnificent promenades, notably that of 'Paseo del Sardinera,' which leads to the bathing establishment. The higher and lower town are direct antipodes in point of architecture and general construction. The Cathedral of Gothic type, has a fine crypt containing a Moorish font. The chief features of the city are its quays and factories,—1,800 women are employed in the tobacco factory; there are ship-yards, paper-works, foundries, extensive breweries, sugar refineries, manufactories of sails, hats, candles, vermicelli, phosphorus, sulphuric acid, fish-curing establishments, etc. The industries, trade, and fishing of Santander are flourishing and important. The harbor conditions have been greatly improved. Extensive acreage has been reclaimed from the sea, and recently built on, a fine esplanade has been constructed, with public gardens and a new quay. The principal export is iron ore, chiefly sent to Great Britain and to Germany. Other exports are wine, flour, provisions, etc. The imports amount to much more, and consist of manufactured articles from England, France, etc., embracing machinery, textiles, foreign produce, timber, petroleum, etc. Women do the lifting of cargoes. Santander was probably the ancient Roman *Portus Blendium*. The town was sacked by Soult in 1808. Pop. about 59,000.

(2) The Province of Santander, on the north coast of Spain, covers an area of 2,113 square miles. It is enclosed on all sides but the north, with lofty summits and traversed by railroads of various kinds. It possesses extensive forests and important mines of iron and lead; it also produces large quantities of grain. The industries of mining, sylviculture and agriculture are steadily improving. Live stock is abundant and valuable, especially in the highlands. Pop. about 300,000.

Santayana, sãn-ta-yã-rí-a, **George**, American educator and author: b. Spain 1863. He was graduated from Harvard in 1886 where he has since been assistant professor of philosophy. His published works are: 'Sonnets, and Other Poems' (1894); 'The Sense of Beauty' (1896); 'Lucifer' (1899); 'Interpretations of Poetry and Religion' (1900); 'The Hermit of Carmel, and Other Poems' (1901).

Santee, sãn-tê, a river in South Carolina, formed by the junction of the Wateree and Congaree rivers, which unite near the centre of the State. It flows southeast and enters the Atlantic Ocean by two channels. The length of the main stream is about 150 miles; it is navigable to Columbia on the Congaree and to Camden on the Wateree. The lower part of its course is through large forests, from which is obtained the pitch pine, and near the coast through swamps and marches.

Santerre, sãn-târ, **Antoine Joseph**, French revolutionist: b. Paris, 16 March 1752; d. there 6 Feb. 1809. He was a brewer by trade and through his wealth and generosity possessed of much influence. His brewery in the Faubourg

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Saint-Antoine was used as a meeting place for the Jacobins and he exerted much authority over their movements. He commanded a battalion of the national guard in the storming of the Bastille in 1789, was conspicuous in the riots of the Champ de Mars, in the attack on the Tuileries in 1792, and in the insurrection of August in that year. He rose to be commander-in-chief of the national guard and a field-marshal. In 1793 at the head of an army of 20,000 men he was defeated at Coron, was recalled and arrested as an Orleanist, and did not gain his release until the fall of Robespierre, after which he retired to private life. There is no evidence to substantiate his classification as one of the extremists of the Revolution. Consult Carro, 'Santerre, sa Vie politique et privée' (1847).

Santiago, sän-tē-ä'gō, capital of the Republic of Chile, situated at the base of the Cordillera of the Andes. It occupies an area of eight square miles in a fertile plain about 2,000 feet above sea-level, and is divided into two districts by the Mapocho River, which is crossed by many iron bridges. The most important part of the city is that which lies between the river and the Alameda de las Delicias, a very wide avenue with many rows of fine trees. Cerro Santa Lucia, a hill rising to a height of more than 200 feet above the gabled or flat house tops, is made an attractive place of public resort by gardens and an open-air theatre. Other distinctive features are Cousiño Park and the Agricultural School Farm, each 320 to 330 acres in extent; the former devoted merely to outdoor recreation while the latter is the most useful centre of public instruction in Chile. Established in 1842, this School Farm (*Quinta Normal de Agricultura*) now includes the Agricultural Institute and Training-School, botanical gardens and conservatories, a zoological garden, the Museum of Natural History, Veterinary Institute, institutes of Vegetable Pathology and Animal Vaccine, and the Chemical Laboratory. Noteworthy buildings are: Congreso Nacional, the Moneda (residence of the president of the republic), Cathedral and Archbishopal Palace, National Library (100,000 volumes), City Hall, Palace of the Courts of Justice, University, National Conservatory of Music, Municipal Theatre, Astronomical Observatory, Museum of Fine Arts (where annual exhibitions of painting and sculpture are held), Central Railway Station, Palace of the Exposition, and many luxurious private residences. District and private schools, and those maintained by religious bodies, are attended by 25,000 pupils; the National Institute (secondary instruction) by 1,200; Commercial Technical Institute, 500; Professional School for Girls, 500. The university provides instruction in medicine (its best faculty), law, engineering, etc. There are also normal schools, a good School of Arts and Trades, Institute of Pedagogy, and schools of the fine arts. The Board of Public Hygiene exerts an excellent influence for the control of diseases which were formerly prevalent. The water supply is good and abundant. Santiago has a mild climate: frosts are not unknown, though snow rarely falls. Industrial establishments are: flour and wood-working mills, foundries, breweries, tanneries, etc. There are seven national and three foreign

banks; electric street cars and a belt-line railway; and railway service for communication with the coast. The state shares with four private companies the task of maintaining the telegraph service. There are two telephone companies. The municipality has an income of about \$2,000,000 for public expenditures. Population (1910) approximately 340,000. On 16 Aug. 1906 the city was visited by a severe earthquake, followed by fire. See also CHILE.

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Santiago de los Caballeros, dā lōs kā-bāl-yā'rōs, Santo Domingo, city; on the Yaque del Norte River; 80 miles northwest of the city of Santo Domingo, 20 miles south of Puerto Plata. It is connected with Puerto Plata by railroad, and also with the east coast by a continuation of the road originally extending from Sanchez to Concepcion de la Vega. It is situated in the Vega Real, the most fertile agricultural section of Santo Domingo, and is the largest and most prosperous inland city of the country. Pop. 10,000.

Santiago-de-Compostella, dā-kōm-pōs-tēl'yā, Spain, a city on the Sar, in the province of Coruña, 32 miles south of the City of Coruña, romantically situated on a slope of Monte Pedroso. It is the seat of a university, and of an archbishopric. The cathedral, completed 1128, is well preserved and has a remarkable interior; other notable buildings are the episcopal palace, the hospital, the town-house, the college of Tomaseca and the great convent of Saint Martin (overhanging a ravine), formerly one of the wealthiest Benedictine establishments and now a barrack. In the large square or Plaza the bull-fights take place. There are many promenades, fountains, and mineral springs in the vicinity, besides pastures and fertile valleys, which produce grain, hemp, fruit, etc. The local industries are distilleries, breweries, soap, chocolate, linen, crystal, paper, and small silver articles. There are good schools and a fine library in the University.

Santiago de Cuba, dā koo'bā or kū'bā, the largest and most eastern province of Cuba; area 12,468 square miles. It is very mountainous; the general trend of the mountains is from southeast to northwest; the river Cauto, the largest river of the island running from east to west, divides the mountain system; the ranges to the north are very confused and irregular, the best defined range is that of the Sierra Maestra, near the southern coast. The valleys and sea-coasts are very fertile; sugar, coffee, cocoa, and tobacco are the chief products; bananas and cocoanuts are cultivated, and vegetables and fruits may be raised with little care or supervision. Mahogany, ebony, and other valuable hardwoods grow in abundance in the interior, and are exported; the census of 1899 reported 519,194 acres of forest land under public ownership. Santiago has more mineral wealth than any other province of the island; iron, manganese, and copper are mined in quantities of commercial importance. Good grazing lands are found in portions of the province, and stock raising is an industry of increasing importance. The development of Santiago de Cuba has been retarded

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by lack of transportation facilities, but with the increase of railroads following American occupation, opportunity is afforded for further exploitation of the large resources. Pop. about 330,000.

Santiago de Cuba, chief city of the province of the same name, situated on a fine bay about six miles from the southern or Caribbean coast of the island of Cuba. It is the centre of the mining district, and has a large foreign trade, though the places of business are unpretentious or even shabby. Many of the dwelling-houses are a single story in height: their gardens, the Alameda, some points on the slopes of the surrounding mountains and the shores of the bay are especially attractive. A noteworthy building is the old cathedral, fronting on the Plaza de Armas. The mean temperature in winter is 82° F., and in summer 88°. It was formerly regarded as an exceedingly unhealthy town, yellow fever being prevalent throughout the year; but a marked improvement in this respect was effected through the sanitary reform measures carried out under the direction of the military government (army of the United States) after the war of 1898. The total population, as shown by the last official census, in 1907, was 45,470. Of that number 15,258 were native whites, 3,440 foreign whites, 24,276 colored, and 116 Chinese. Married persons numbered 6,396; those living together as husband and wife by mutual consent, 3,299; illegitimate children, 5,824 (white 1,208, colored 4,616). Inhabitants 10 years of age or over who could neither read nor write numbered 10,527. Occupations were as follows: 1,419 were engaged in agriculture, fisheries, or mining; 3,063 in trade or transportation; 6,381 in manufacturing or mechanical industries; 429 in professional service; 5,449 in personal service; 26,349 were without gainful occupation. Number of occupied dwellings 7,574. The city has a good water-supply, furnished to 94 per cent of the dwellings, etc., through an aqueduct called El Paso de la Virgen. Santiago was founded in 1514; from 1522 to 1552 it was the capital of the island. For subsequent events, and especially the important naval and military operations in 1898, consult Marrion Wilcox, 'A Short History of the War with Spain.' See also CUBA.

Santiago de Cuba, Military and Naval Operations at. For an account of these events of the Spanish-American war, see UNITED STATES, *War with Spain*.

Santiago del Estero, dēl ēs-tā'rō, Argentina, (1) Capital of the province of that name, lies in a fertile valley on the right bank of the Rio Dulce. Its chief buildings are the cathedral, national college, primary schools and bank. It has extensive orchards. The town was founded in 1553. Pop. 10,000.

(2) The province of Santiago del Estero is situated in the north-central part of the republic, covers an area of 39,764 square miles, and consists of a broad plain with several low ranges in the west, and a few salt marshes in the south. The streams are the Salado and Dulce rivers. Irrigation is necessary; sugar, corn, wheat, grapes, cotton and tobacco are grown, and stock-raising is an important industry. The chief occupation is wool-weaving. The

forests contain valuable woods. The climate is hot.

Santiago de las Vegas, dā lās vā gās, Cuba, a town in the province of Havana a few miles south of the capital, on the Havana-Guanajay Railroad. The town lies on elevated ground, and is a suitable place for the acclimatization of foreigners. It is regularly built, with two plazas and a handsome church. The tobacco industry is predominant.

San'tiam, a tribe of the Kalapooian stock of North American Indians formerly residing on Santiam River, a tributary of the Willamette, in Oregon. They are now at Grande Ronde reservation, Oregon, numbering only 24 in 1902.

Santillana, sän-tēl-yā'nā, Iñigo Lopez de Mendoza, MARQUIS OF, Spanish poet and statesman: b. Carrion de los Condes, Spain, 19 Aug. 1398; d. Guadalajara, Spain, 26 March 1458. He was the son of the grand admiral of Castile and heir to immense estates of which he was deprived until he was 18, when he came into their possession. He waged a long and successful war against Aragon and the Moors, and in recognition of his services was made Marquis de Santillana by Juan II. of Castile. After the death of that king in 1454 he retired from political life and devoted himself to literature. His best-known work is 'Los Proverbios,' or 'Centiloquia' (1496), a collection of 100 proverbs made at the desire of the king for his son, later Henry IV. He wrote: 'Dialogo de Bias contra Fortuna' (1448); 'Comedieta de Ponza'; etc. His works were edited by Amador de los Rios.

Sant'ley, Charles, English baritone: b. Liverpool 1834. He studied music in England and Italy and made his debut in opera at Covent Garden in 1857. He won a great success as Hoel in the opera 'Dinorah' in 1859 and in the part of Rhineberg in 'Lurline' in 1860. He has been especially devoted to Italian opera and has sung in the large capitals of Europe, in Australia and South Africa. He published 'Student and Singer' (1892).

Santo Domingo, sän'tō dō-mēng'gō, called also HAITI, the second in size of the West Indian Islands. Its greatest length is about 400 miles; its greatest width 160 miles; its area is estimated at 28,249 square miles. But, as Robert T. Hill says, "The horizontal area encircled by its waters is trebled by the verticality of the mountains;" and certainly the problem of maintaining good order upon the island is more than trebled in difficulty by the same natural features. It seems entirely possible that if such a system of highways and railways as the English have constructed in Jamaica (q.v.) were established in Santo Domingo, the long period of almost unceasing political disturbances and revolutions, in both the Dominican Republic and the Republic of Haiti, would gradually come to an end; otherwise there can never be offered a convincing demonstration of the important fact that this island, which falls behind all others in achievement, excels nearly all others in the world—certainly the neighboring members of the Greater Antilles—in natural fertility and in diversity of climate. (See DOMINICAN REPUBLIC for particulars in regard to physical geography, geology and mineral resources, history,

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population, etc.) The impression commonly received by intelligent travelers and students is shown in the following quotations: "Taken altogether and looked at in its natural aspects, no spot on earth can be more lovely, and it is safe to say that probably no extent of territory contains within itself, under proper auspices, so many elements of prosperity, worldly success, and happiness as this island." Again, Santo Domingo is referred to as "beautiful, majestic, and fruitful . . . waiting only the assistance of law and sound government to take its proper place in civilization." But it is unreasonable to expect "law and sound government" or the beneficent effects of "proper auspices" before the interior regions have been made accessible, and inland communities connected with one another. Difficulties which the Haitians have encountered, in their portion of the island, are enumerated in the 'North American Review,' July 1903. But the greatest obstacle still to be overcome is that one which the author of the present article has mentioned (in 'Harper's Weekly,' editorial, 'The Paradox of Santo Domingo,' 12 March 1904), substantially as follows: The inhabitants have always been exceedingly turbulent because their territory has always been exceedingly mountainous. They are politically disunited—not occasionally, but as their chronic misfortune—because those natural features which are the very type of permanence, the impassable mountain barriers, scatter the people among small communities in isolated areas. They are abnormally prone to revolutions, like the Colombians, not owing wholly or even mainly to personal characteristics that differentiate them from the inhabitants of the somewhat more peaceful Southern republics, but because Santo Domingo, more than all the other Latin-American countries excepting Colombia, has from the beginning been afflicted by that kind of topography which forbids the widely scattered political groups ever to draw near to each other socially and commercially, thus developing identical interests. Now, although the cause of the trouble is found in the extreme ruggedness of the island—the island itself being, in fact, nothing but the culmination of the Antillean continental uplift that formed eastern Central America as well—no careful student of West Indian history will conclude that the deplorable effect must be accepted hopelessly, as though it were an immutable condition. On the contrary, it is just as certainly possible to do away with the effect as it is certainly impossible to remove the cause: a paradoxical statement which must stand at the beginning of any sound policy that may be framed in the United States, in Santo Domingo and Haiti, or in Europe, for the redemption of the island; otherwise all efforts will be made in vain. We must remember that upon no other portion of the New World have highly civilized powers in the past tried more earnestly to impress by force of arms the lesson of respect for the rights of other nations; and that the armies of those polite foreign powers gave over the attempt as futile only after prolonged exertions and bitter suffering inflicted and sustained. Long ago France, Spain, and England, "once for all," learned by experience what we, surely, may learn by a little exact and dispassionate study. Santo

Domingoans and Haitians do not especially need the lessons that our navy or army could teach. Neither do they especially require missionaries or schoolmasters; since the religious and secular instruction already provided for them is not without merit. But as an indispensable preliminary to all genuine progress, a complete system of highways and railways must be built. We do not suggest in this any visionary or impracticable scheme. England constructed such a system of inland communications in mountainous Jamaica, and the negroes and half-breeds of Jamaica have been well-behaved during a long, severely trying period of financial distress that the smaller island has passed through since the price of sugar began to decline. The experiment has, therefore, been made elsewhere, under similar conditions, and the results are satisfactory: that is, good order has been maintained with ease in Jamaica, despite its mountains and its mixed, chiefly black, population. As we are dealing at present with the elements of the subject, the question of a protectorate, a colonial government, or any kind of foreign control in Santo Domingo should be excluded. The people of the little eastern and western republics there may or may not be able to gain facilities for communication without losing their independence: if there were good roads through the central Desoblado district that now holds them apart, the two nations would coalesce, and foreigners who should furnish capital for building roads of all kinds would hold a perilous claim. The certainties are these: Civil and electrical engineers can do more than the best army and navy in this field, by accepting the rough prohibition of the mountains as a challenge to their skill. The pacific course in this grave matter is confessedly difficult, and no whit spectacular; but we may save time and trouble if we realize now that the way of the engineers is the *only* way; that the infliction of an unmitigated punishment, with which no reasonable hope of correction and amendment can be associated, would be an un-American proceeding. (See also DOMINICAN REPUBLIC, subtitle *Railways*, etc.) Among the physical characteristics, next in order of interest stand the deep indentations in the coast-line, especially the Bay of Samaná in the northeast, the Gulf of Gonaïves in the west, and the scarcely less important bays in the north and south. Adjacent islands deserving special mention are: Ile de la Tortue, or Tortuga, near the northwestern promontory, famous as the headquarters of the buccaneers in the 17th century; Gonave Island, northwest of Port-au-Prince; and Beata, Saona, and Vache islands, off the southern coast. All of these have shared the geologic history of the main island, from which they appear to have been separated in a relatively modern epoch. MARRION WILCOX,

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Santo Domingo de Basco, dā bās'kō, Philippines, pueblo, Batanes Islands, province of Cagayan; on the northwest coast of Batan Island. It is the chief town of the group and is well built, with several fine buildings. It has a good anchorage in Santo Domingo Bay; the inhabitants are chiefly engaged in the coasting trade and in fishing. Pop. 3,000.

SANTO TOMAS—SAO LEOPOLDO

Santo Tomás, tō-mās', Philippines, pueblo, province of Batangas, Luzon; 26 miles north of Batangas. It is on the main road to Manila and on the line of a projected railroad, near the boundary of Laguna. It has good schools. Pop. 10,770.

There is a smaller pueblo of the same name in the province of Union, Luzon, 22 miles south of San Fernando; at the head of the port of Santo Tomás on the main road. Pop. 6,480.

Santo Tomas, a mountain of the Philippines, in the southern part of the province of Union, east of Agoo. It is 7,418 feet in height, the highest peak in the province. On its western side the land slopes rapidly to the coast.

San'tonin, a proximate principle ($C_{12}H_{14}O_8$), the active principle of *santonica*, possessing acid properties, obtained from wormseed, the seed of a species of southernwood. It is colorless, crystallizable, and soluble in alcohol, and in the fixed and volatile oils, is bitter, and is one of the most efficacious vermifuges for roundworms.

Santorin, sän-tō-rēn', **Thera**, or **Calliste**, Greece, the largest of one of the island groups in the Aegean Archipelago, 60 miles north of Crete. The eastern slope is covered with vineyards; the western shores are precipitous, with deep ravines and volcanic indications. The towns occupy the lofty heights overlooking precipices. The wines of the island are the chief staple, and are called *vino-brusco* and *vino-santo*. Various eruptions have occurred in the vicinity which from time to time have changed the surrounding topography. Pop. 12,000.

Santos, sän'toos, Brazil, in the state of São Paulo, and 34 miles by rail from the capital of that name, is the chief port. It stands on the island of San Vicente, in a bay of the South Atlantic, and is very well built. Churches crown Monserrate, and it has several monasteries, a city-hall, custom-house and two hospitals, an arsenal, several banks, gas and water supply. Its harbor though small, is deep, and the emporium of an extensive trade—especially for Brazilian coffee, besides sugar, tobacco, hides, lard, tobacco, etc. The imports are European and American manufactures. Yellow fever is endemic. It is the terminus of the main railway system of Brazil.

Santos-Dumont, sän-tōs dū-môn, **Alberto**, French aeronaut; b. San Paulo, Brazil, 20 July 1873. He was educated chiefly in France, and has resided in Paris since the death of his father, a coffee planter. Having experimented in aeronautics he made an ascent on 4 July 1898 from the Jardin d'Acclimation, Paris, in a spherical balloon 18 feet in diameter. At this time he was engaged upon the construction of a dirigible balloon which he completed so as to make the trial ascent on 20 September. It proved itself dirigible, but the experiment ended in disaster owing to the insufficiency of the air-pump. A second and a third machine were constructed, the latter being cigar-shaped, 66 feet long and 11½ feet in greatest diameter. It carried a 4½ horsepower petroleum motor to work a 5-foot propeller making 2,500 revolutions a minute. It was steered by a rudder of silk and bamboo having an area of about 25 feet. This machine ascended from Vaugirard, 13 Oct. 1899, sailed to the Champs de Mars, encircled the Eiffel Tower several times, proceeded to Auteuil and

finally landed at the maneuver grounds at Bagatelle. He continued experiments with new balloons, and on 18 Aug. 1901 his balloon collapsed and fell to the roof of the Trocadero Hotel. On 19 Oct. 1901 he won the Henri Deutsche prize of 100,000 francs offered for a trip from the Aero Club at Saint Cloud around the Eiffel Tower and back to the point of departure in less than an hour. The actual time employed was 29 minutes and 30 seconds, the return being made against a strong wind. In 1902 he went to Monte Carlo with the design of crossing the Mediterranean and after making several ascents suffered an accident which precipitated himself and his balloon into the bay of Monaco.

São Francisco, sãn frãn-sēs'kō, a river of Brazil, which rises in the Serra da Canastra, in the southwest of the province of Minas Geraes, flows north-northeast through that province and the province of Bahia, then turning east forms the boundary between the provinces of Pernambuco and Alagoas on the north and Bahia and Sergipe del Rey on the south. It falls into the Atlantic 50 miles north-northeast of the town of Sergipe del Rey by two mouths, one to the north, called Aricari, so shallow as to be scarcely navigable even by canoes; and the other to the south, hence called Francisco do Sul, much larger and deeper, but unfortunately encumbered at its mouth by a large bar about six miles broad, covered with a heavy surf, and with seldom more than four feet of water on it. It is a large and majestic river, with a course which has been estimated at 1,600 miles, but, in addition to the bar at its mouth, has numerous rapids and cataracts, which make its continuous navigation impossible; those at Paulo Affonço, about 190 miles inland, are about 60 miles in length. Its principal affluents are, on the right, the Paraopeba, Guacuihi or Vethas, Jequitahi, and Verde; and on the left the Andaia, Borrachudo, Abaité, Paracatu, Urucaia, Carinenha, Correntes, and Grande.

São João da Barra, sãn zhō-on' dā bār'rā, or **São João da Parahyba**, Brazil, a town on the Atlantic coast of the state of Rio de Janeiro, at the northern end of the state. It is the port of Campos, with which it has railroad connection. But since Campos became connected by rail with Rio de Janeiro, São João has lost its importance, as the port is only an open roadstead. Pop. 5,000.

São João del Rey, dël rā'ē, Brazil, a town in the state of Minas Geraes, situated 75 miles southwest of Ouro Preto, on the railroad running west from Barbacena. It was founded as a gold-mining town, but the gold has been exhausted, and the chief wealth of the town now comes from cattle raising and the manufacture of cloth. Pop. 10,000.

São Leopoldo, lā-oo-pōl'dō, Brazil, a town in the state of Rio Grande do Sul, situated on the railroad 18 miles north of Porto Alegre. The town has two churches, a Jesuit college, and two high schools. It has had a considerable industrial and commercial development. Agriculture, viticulture and cattle-raising are carried on successfully in the surrounding country, and the town manufactures leather-goods. The products of the town have amounted to over \$6,000,000 annually, most of them going to Porto



ALBERTO SANTOS-DUMONT.

Photo by Burr McIntosh.

SAO LUIZ DE MARANHÃO — SAP-GREEN

Allegre, which, besides the railroad connection, can be reached by steamboats on the Rio dos Sinos. The town was founded by German immigrants, and most of the inhabitants are still Germans. It was almost totally destroyed during the civil war of 1846. Pop. (commune) 30,000.

São Luiz De Maranhão, loo-êzh dā mā ran yāh. See MARANHAM.

São Paulo, pow'loo, a state of Brazil, bounded on the north and northeast by Minas Geraes and Rio de Janeiro, on the southeast and south by the Atlantic Ocean and Paraná, and on the west by Matto Grosso. Area, 112,278 square miles, including a large section of fertile but unsettled land near the Paraná River, which forms part of the western boundary. The principal mountains are between the capital of the state and Santos, the Mar range (average height about 3,250 feet); and, farther toward the interior, the Mantiqueira range. Adjoining the coast is a comparatively narrow strip or zone, low-lying and tropical in its characteristics; but an abrupt ascent leads from this to the plateau which extends westward to the Paraná, sometimes cut by the valleys of the river system, sometimes rough and mountainous, but in general maintaining an altitude which ensures a temperate climate. In fact, the winters in the southern part of the state are decidedly cold, frosts occurring many times during a single season; and at the capital the temperature occasionally falls below 32° F. The fertile red soil of the plateau is peculiarly adapted to the cultivation of coffee; and the importance of this product is shown by the following official (Brazilian) statistics: During 1899 the exports of the state of São Paulo were valued at 268,671,867 *milreis* (value of *milreis* in U. S. currency, \$0.546), coffee entering into that amount for the sum of 249,559,450 *milreis*. The relative value of minor products appears more clearly in another statement: During the first six months of 1900, the exports through the port of Santos amounted to 89,705,641 *milreis*, as follows: animals and animal products, 359,284; minerals and mineral products, 63,124; vegetables and vegetable products, 89,293,233, and in the last item coffee is represented by 88,594,682 *milreis*. The railway system of this state, with that of the neighboring Rio de Janeiro (q.v.), is the best in Brazil. A notable piece of engineering is seen on the line which crosses the Cubatão range at a height of more than 2,500 feet. The principal cities are the capital, São Paulo, and the leading port, Santos. The growth of the city of São Paulo during recent years has been so rapid that current estimates of the increase of population, the number of new buildings, etc., appear to be untrustworthy. Its manufacturing industries are diversified, and its new prosperity has given it many of the features of a modern city. Santos (pop. 41,000) is built on an island, a narrow channel separating it from the mainland. Its harbor and general sanitary conditions have been improved by important works recently completed. Taubaté is a growing town in the eastern part of the state, and Campinas the most important place in the northern districts. Two of the main causes of the prosperity of this state—which is generally regarded as the most progressive part of Brazil—are successful agriculture and undertakings to improve the

means of communication. The third cause has been immigration. From 1827 to 1896, inclusive, 700,211 immigrants reached the state, 493,535 coming from Italy and the rest from Portugal, Spain, Germany, Austria, etc. Governor (afterward President) Campos Salles has pointed out that in 1896, when the total immigration to São Paulo numbered 74,918, more than one half (or, exactly, 42,661) came at the expense of the national government, and the rest at the cost of the state. Compare 'United States of Brazil: a Geographical Sketch' (Washington, 1901).

MARRION WILCOX,
Authority on Latin-America.

São Thomé, tō-mā', or Saint Thomas, Africa, an island in the Gulf of Guinea belonging to Portugal, and situated a little north of the equator in lon. 6° 30' E., 150 miles northwest of Cape Lopez. Its area is 358 square miles. The whole island consists of a volcanic mountain 7,026 feet high, and heavily forested. The climate is equable, temperate and healthful, and the soil is very fertile. The chief products are coffee, cocoa, oranges, lemons, figs, grapes, pine-apples, vanilla, cinnamon, india-rubber, etc. The exports are valued at over \$3,500,000 annually. Pop. about 40,000. São Thomé forms, with the neighboring island of Príncipe, a Portuguese province. The capital is Cidade, with a safe harbor, and a pop. of 3,000.

Saône, sôn (ancient, ARAR), France, a river which rises at Viomenil, in the department of Vosges, flows southwest through that department, traverses the department of Haute-Saône, and on entering the department of Côte-d'Or, receives the Ognon. Continuing a southwest course, past Auxonne, it receives its most important tributary, the Doubs. It flows past Châlons and Maçon to Lyons, where it joins the Rhone after a course of about 280 miles; of these 190 miles are navigable. The Canal du Centre, Canal de Bourgogne, and Rhone and Rhine Canal, bring it into communication respectively with the Loire, Seine, and Rhine.

Sap, the fluid which circulates in plants, and consists of water carrying various nutritive salts in solution. This water and its contents, "crude sap," so-called, is absorbed by root-hairs and permeates the plant, passing through the woody portions of the vascular bundles, in the newer rings of the "sap-wood," which, in dicotyledons, constitutes a woody cylinder between the bark and the heart-wood or pith. This sap, by some process which is not fully understood, but which is ascribed to root-pressure, transpiration or suction, severally or collectively, carries its raw materials to the chlorophyll granules in the green, growing parts of the plant, where they are metamorphosed into organic substances, and are again taken away through the vast cells to those places where they are needed for the life or propagation of the plant, or are stored for future use. Maple and corn sugar, india-rubber, opium and the milk of certain plants are all saps, and the products of the lactiferous cells. Many plants, such as cacti, and others, living in desert regions, store away water to carry them through the droughts, a fact which is taken advantage of by travelers in thirsty lands.

Sap-green, a yellowish-green pigment which is prepared by mixing the purplish-red

SAPAJOU — SAPPHIRE

Juice expressed from the ripe berries of buckthorn (*Rhamnus catharticus*) with an alkali. The liquid is fermented, evaporated until it has reached a proper consistency, and then suspended in bladders, to harden into a brittle mass. The color is used by water-color painters, paper-stainers and leather-dyers, but is very fugitive.

Sap'ajou, or **Sajou**, a French adaptation of an Indian word, and now applied to several species of American monkeys of the family *Cebidæ*. The sapajous live in flocks in the forests of Brazil, Peru, Guiana, and Colombia, and possess tails of feebly prehensile powers, and feed on fruits, eggs, small birds, etc. They are familiar in habits, become soon domesticated, and are thus in favor among mountebanks, etc., who teach these monkeys to become very expert in performing tricks. Common species of sapajous are the sai (*Cebus capucinus*) and white-throated sapajou or sajou (*C. hypoleucos*).

Sapan', or **Sappan'-wood**, red dyewoods, obtained from two genera of the *Leguminosæ*, but principally from *Casalpinia sappan*. This tree is indigenous to tropical Asia and to the Indian Archipelago, but since it gives a good, red dye, similar to that of Brazil-wood, although somewhat difficult to fix, its cultivation is promoted in the West Indies and Brazil.

Sapi-utan, a small wild ox of Celebes. See ANOA.

Sapindaceæ, sãp-in-dã'sê-ê, a family closely allied to the maples, and containing the soapberry (*Sapindus*), buckeye (*Æsculus*) and litchi-nut (*Nephelium*) and other genera. The species are usually tall trees, with watery juice. The leaves are generally compound, and in the tropics are alternate, evergreen and abruptly pinnate. The flowers are small, but in showy racemes in the buckeyes, sometimes apetalous, sometimes with four or five unequal and imbricated petals, and about the same number of sepals; the stamens are eight, and are situated on a disk; the ovary is 3-celled, becoming in fruit capsular or indehiscent, or composed of several wing fruits, or a drupe, or nut, or berry. The species are mostly found in warm countries. The fruits of several, such as the *Nephelium*, are eaten, but the leaves of many are poisonous. The typical genus *Sapindus* has a very saponaceous fruit, used in the place of soap. In Brazil, a paste called "guarana" is made from the pounded seeds of the sapindaceous climbing shrub, *Paullinia cupana*, and serves for food, for medicine (since it contains caffeine), and for the preparation of a refreshing drink.

Sapodil'la, or **Sapodilla Plum**, an evergreen tree (*Achras zapota*) some 20 feet high, with thick, shining leaves, clustered at the ends of the branches, and a milky juice. It is sometimes called bully-tree, also, and is indigenous to tropical America, where it is often cultivated for its fruit. The flowers are small and whitish, and the sapodilla, the fruit, resembles a russet apple in color and size, and has a milky acrid juice, which disappears when over-ripe, leaving the fruit in a sugary condition and with a pleasant, pear-like flavor. It is a valuable food in warm countries, and is sometimes called naseberry. The seeds are large and black, and used as an aperient and diuretic. The juice of the sanodilla is made into chewing-gum, the bark is astringent, and employed as a febrifuge (Jamaica

bark), and the wood is reddish-brown, hard, heavy and durable.

Sap'onin, a glucoside contained in the roots of *Saponaria officinalis* or soapwort and many other plants; also in the fruit of the horse-chestnut, in quillai-bark or soap-bark, etc. By means of boiling alcohol it is readily extracted from the root of soapwort, the alcohol, as it cools, depositing the saponin as an amorphous sediment. It derives its name from its behavior with water, in which it is soluble in all proportions, yielding an opalescent fluid which froths when shaken like a solution of soap, if even ~~rather~~ part of saponin be present. Its solution, or an infusion of soapwort, is sometimes employed in place of a solution of an alkaline soap for cleansing the finer varieties of wool from grease. Many preparations for cleaning kid gloves, etc., derive their virtues from saponin.

Sapor I., sã'pôr, or **Shapur**, shã-poor', Persian king, the 2d of the line of Sassanidæ (q.v.). He reigned from 242 A.D. to 272 A.D. and during this period there was continuous warfare with the Roman Empire. While no permanent increase of Persian territory was made the armies of Rome were subjected to some humiliating defeats. In one of these (260), the Roman Emperor Valerian was taken captive and was held captive until his death. See PERSIA.

Sapotaceæ, sãp-ô-tã'sê-ê, a large genus of trees and shrubs of the heath tribe, indigenous chiefly to the tropics, and principally to the tropical islands. The leaves are entire, alternate and leathery, with flowers clustered in the axils of the leaves, or at the older stem-nodes. The flowers are regular, bisexual, with stamens borne on the corolla, as many, or twice as many, as its lobes; the calyx-lobes are rigid and obtuse, and longer than the corolla-tubes; the fruits are baccate. The *Sapotaceæ* have a milky juice which furnishes true gutta-percha (q.v.). The sapodilla and star apple of the West Indies are fruits produced by this family.

Sappan'-wood. See BRAZIL-WOOD.

Sapphire, a mineralogical name including all highly colored and transparent varieties of corundum (q.v.), except the red, which is called ruby. Sapphire corundum occurs in three forms—as small, distinct crystals, hexagonal or rhombohedral in various modifications; as transparent portions of ordinary corundum; and at times as nodules or small rounded masses enclosed in ordinary corundum, though distinct. Most gem sapphires are of the first kind; but some fine stones have been cut from material of the two latter kinds, especially in the corundum workings in North Carolina, notably the Cula-gee mine in Macon County. Sapphires present almost every variety of color, although blue is the most familiar, deep shades being most valued. Other blue gems occasionally seen are blue tourmaline (called Brazilian sapphire), cyanite, and iolite, which is known somewhat as water-sapphire. True sapphires are, however, easily distinguished by their greater hardness (9), and density (3.95 to 4.1). The main sources of sapphire are Ceylon, Cashmere, and the Pailin district of Siam, also the Anakie district of Queensland, Australia. In the United States, sapphires are obtained chiefly in Montana; first from the "bars" or low bluffs, of gold-bearing gravel, along the Upper Missouri River, east of Helena,

SAPPHO — SARABAND

and later from a decomposed igneous dike at Yogo Gulch, in Fergus County; also at Rock Creek, Granite County, and Dry Cottonwood Creek, Deer Lodge County. The river bars, and Rock Creek, yield a great variety of rich and delicate colors, as in Queensland, but Yogo Gulch furnishes the deep blue shades most valued, and is being worked very extensively. Small and poorly colored stones are largely sold for watch-jewels. All blue and green sapphires, like rubies, possess marked dichroism, a point important to the lapidary, as the tint of gems from such crystals depends upon the direction in which they are cut. See GEMS.

Sappho, sāf'ō, Greek poet: b. Mitylene, or Eresus, Island of Lesbos. She was the greatest of ancient poets of her sex and flourished between 630 and 570 B.C., being a younger contemporary of Alæxus. Little is known certainly of the events of her life. On account of political commotions she left Lesbos for Sicily. But in later years she returned to Mitylene where she became the centre of a female coterie, a school of poetry of which the famous Erinna was a member. She was the author of various poems; hymns, odes, elegies, epigrams — of which only two complete pieces, an ode 'To Aphrodite' and 'To a Maiden,' together with some fragments, have come down to us; these display intense feeling, glowing imagination, and a high finish. One of them is quoted in full by Longinus in his treatise 'On the Sublime.' She is said to have invented several metres; at least one still bears her name, and has been used by such ancient poets as Horace and such modern ones as Canning in his 'Needy Knife-grinder.' There is an edition of the extant fragments with translations and memoir by H. T. Wharton (1885).

Sappho's Leap. See CAPE DUCATO.

Sapra'mia. See BLOOD-POISONING.

Saprolegniaceæ. See FUNGI.

Sap'rophytes, a class of plants living on the carbonic compounds resulting from the decay of organic life. They sometimes contain chlorophyll, but generally do not, and since organs of assimilation are therefore not necessary, the leaves in many kinds are reduced to mere scales. This habit of existing only on decaying organisms makes the higher saprophytic plants very difficult to transplant. Algæ are often saprophytes, making use of the decaying refuse of the sea; and fungi, especially the molds and dung-loving genera as *Splachnum*, are the most generally known cryptogams acting as scavengers in this manner. Even the globular alga, the "red snow" (*Spharella nivalis*), exists on the corpses of insects, pollen-grains, and other decaying materials drifting across the snow. Certain other saprophytes attach themselves to the bark of trees, not to suck the juices of the host in the manner of parasites, but to subsist on the decaying bark, and on the organic dust and material in solution washed down by the rain and stopped by the projecting mass of the plants. Many saprophytic plants living in the cracks of rocks, have only the humus collected in tiny pockets, and the supply of dissolved organic matters in percolating water, to draw upon. Some orchids, as the coral-roots (*Corallorhiza*), that have no true roots, but a thin-skinned rootstock, which absorbs nutriment directly; the familiar Indian

pipes (*Monotropa*) and others, spring from the humus of decaying leaves, in close connection with the hyphæ of fungi. The meadow pastures support such saprophytes as the true mushroom (*Agaricus campestris*), the moonwort (*Botrychium lunaria*) and the blue and violet flowered gentians. See BOTANY; FUNGI.

Sap'sucker, the popular American name of several small woodpeckers, but properly restricted to the yellow-bellied woodpecker (*Sphyrapicus varius*), an Eastern species represented in the Rocky Mountain region by variety *nuchalis* and along the Pacific coast by variety *ruber*. This woodpecker is of moderate size; is black and whitish above; black on breast; rump black and white mixed; belly more or less yellowish; sides streaked with dusky; crown red in the adult; chin scarlet and throat black in the male, but both white in the female. This bird illustrates well the curious tendency toward increase of red in plumage toward the Pacific coast. In variety *nuchalis*, the nuchal band is red instead of brown, extending the chin-red by so much; in specimens from Nevada, the scarlet area is still larger; and in the Coast form (*ruber*) the whole head, neck and breast are red, sometimes obliterating the normal pattern. This woodpecker is migratory, spending its summers and breeding only in the cooler parts of the United States and northward, and going South in midwinter. Its habits differ from those of other woodpeckers mainly in its custom of drilling a great number of holes in the bark of trees, to get at and eat the new wood and sugary sap lying beneath it. In many cases serious harm is done to fruit trees by the great number of chains of holes so bored, although many harmful insects are also devoured. See WOODPECKERS, and consult authorities cited thereunder.

Sapucaia (săp-oo-ki'ā) or **Paradise Nuts**, the seeds of *Lacythis zabucayo*, or sometimes those of *L. ollaria*, belonging to the *Myrtaceæ* and closely allied to the Brazil nut. The trees grow abundantly in the northern part of South America and are more than 75 feet high. The nuts are superior in flavor to, and more wholesome than, the Brazil nuts, having a sweet almond-like taste. They are about two inches long and an inch in thickness, with a corky shell furrowed lengthwise, and are found in hard urn-shaped fruits, six inches across and with a woody wall half an inch thick. These curious capsules, which are very hard and have a lid which fits the top closely, but which falls off when quite ripe, are called monkey-pots, a name given also to others of the genus, perhaps not only on account of the shape of the capsule, but because monkeys are said to be very fond of the seeds, which are scarce for this reason. An edible and soap-making oil, which soon grows rancid, is expressed from sapucaia nuts.

Sara, sā'rā, Philippines, pueblo, province of Iloilo, Panay; in the district of Concepción, two miles northwest of the town of Concepción. Pop. 10,950.

Sar'aband, a dance, said to be derived from the Saracens. Its character is grave and expressive. It originated in Spain, where it was formerly danced to the castanets. Handel, Bach, and other masters, frequently wrote tunes of this description for the harpsichord or clavichord.

SARACENIC ARCHITECTURE—SARAGOSSA

Saracenic Architecture, the style adopted by the followers of Mohammed in building their mosques, palaces, and tombs. Originally the Arabs possessed no distinctive architectural style, and the style which they at length made their own was developed by architects belonging to the countries which they had conquered. This style is chiefly represented in Egypt, and North Africa, Persia, Spain, Turkey, and India, but the Saracenic architecture of Spain is generally called by the distinctive name of Moorish. The prominent features of Saracenic architecture vary with the style whether Indian, Mohammedan, North African, or Spanish, but may be characterized as the dome, and the pointed arch. The domes generally rise from a square base, sometimes in groups of three or more, are graceful in form, and frequently enriched externally with colored tiles or other decorations. The minarets are towers of considerable height, rising in stages or stories, each with a balcony, and are most frequently octagonal, sometimes cylindrical, rising, however, from a square base. The arch is of the pointed variety, this form having been used by the Arabs in Egypt before the rise of the Gothic in Europe. It is sometimes of the horse-shoe form (see ARCH). Externally the tops of walls are often finished off with an upright cresting, which may be regarded as an ornament taking the place of a cornice. Flat surfaces are frequently ornamented with a profusion of scroll work and conventional foliage, often in intricate and beautiful designs. Stucco is much used in ornamentation. The mosque el-Aksah at Jerusalem, reconstructed by Abd el Malek in 691 A.D., shows evidence of the Christian art of the time in its basilica of seven aisles. In Egypt the Saracenic art began with the mosque which Amru erected at Old Cairo in the 21st year of the Hegira (642 A.D.). Subsequently repaired and altered, it may now be considered as a good specimen of Moslem architectural art when freed from Christian influence. But the perfected Saracenic art dates from the building of a mosque at Cairo by Ibn Toulon in 876 A.D. This building is nearly square (390 feet by 455) with a central court, around which on three sides are ranges of arcades, while on the side toward Mecca there are five. It is built of brick covered with stucco. The mosque and tomb of Kaid Bey erected in 1463 outside Cairo is one of the most graceful specimens of Saracenic architecture. When the Turks captured Constantinople in 1453 they appropriated the Christian churches of the city, the most important of which was Saint Sophia. Such was their appreciation of this Byzantine building that they adopted its architectural style with modifications in all the mosques which they subsequently built there, and all the Saracenic building within the bounds of the old Byzantine empire is founded on Byzantine models. Byzantine, modified by Persian thought, would be the best definition of Saracenic art, excepting in India, where the Moslem building was carried on under a Renaissance influence of a special kind. The finest of these was built by Suleiman in 1550 A.D., and occupies nearly a square, being 225 feet by 205. In Persia the Saracenic architecture is supposed to be a development of the old Babylonian or Assyrian. The ruined mosque of Tabreez, one of the finest of its kind, belongs to the Mogul

dynasty, and was begun by Ghazan Khan in 1294 A.D. In form it resembles a Byzantine church, but it is chiefly remarkable for the decorative results obtained by mosaic of glazed bricks and tiles in brilliant colors. The most splendid of Saracenic buildings in Persia was built during the dynasty of the Sufis by Shah Abas (1585-1629) in his capital of Ispahan. This was the Maidan or bazaar, a large rectangular area enclosed by an arcade two stories in height, and to which was attached the great mosque or Mesjid Shah and other buildings. This latter building is 223 feet by 130, the centre compartment being surmounted by a double dome, whose external height is 165 feet. Taken as a whole the Maidan Shah, with its gates and mosques, superbly decorated, is one of the most effective specimens of Saracenic architecture. See ARCHITECTURE.

Saracens, sār'a-sēnz, a people mentioned by Ammianus Marcellinus as inhabiting the northern district of Arabia Felix. At the period of the Crusades the term was employed to designate all infidel nations, against which crusades were preached; and in course of time it became the generic name of all the Arabian tribes who embraced Mohammedanism, and extended their conquests in Asia and Africa.

Saragossa, sār-a-gōs'a, Maid of, Spanish heroine: d. Ceuta, Spain, 1857. Her name was Augustina, and she was a vivandière in the Spanish army. During the siege of Saragossa (1808-9) she distinguished herself on several occasions in battle, and was made sub-lieutenant. Her praises are sung by Byron in 'Childe Harold,' canto i. 54-56.

Saragossa, or **Zaragoza**, thā-rā-gō'thā (ancient CÆSAR-AUGUSTA), Spain, (1) Capital of a province of its own name, and of the ancient kingdom of Aragon, situated on the River Ebro, in a fertile plain, 174 miles northeast of Madrid. The town is highly picturesque with its forest of towers, cupolas and spires, the houses of solid masonry highly ornamented, a city of castles and palaces. Many of the chief buildings were destroyed by the French invaders. Others deserving notice are the exchange (1551); the Torre Nuevo; the old citadel, Aljaperia, built by the Moors; hospitals, numerous churches and charitable institutions, town-house, new university, schools of medicine, theology, etc., many monastic institutions, theatre, baths, museum, bull-ring and botanical gardens and promenades. Agriculture is the principal occupation of the inhabitants and the industries include machinery and iron foundries, tanneries, carriages, preserves, breweries, glass, candles, soap, liqueurs, distilleries and porcelain. Some of the articles referred to are imported besides rice, dried cod, bar-iron, timber and dye-stuffs. The exports consist chiefly of chocolate, paper, cast-iron, wool, hats, dyed silks, soap, and especially wheat and flour—mainly to Catalonia. Saragossa was the Salduba of the Celt-Iberians, but the walls are all that remain of the ancient city. It renounced paganism at an early period, and Aulus Prudentius, the first Christian poet, was born here in 348 A.D. It suffered from various wars, and in 1808 sustained two memorable sieges, costing 60,000 lives, but finally capitulated to the French.

SARAH.—SARATOGA SPRINGS

(2) The province of Saragossa contains 6,607 square miles. The highest elevation is 7,700 feet. On the northwest are the spurs of the Pyrenees. The Ebro, Jalon, Huerva, Aguas, Arva and Gallego and part of the Aragon are the chief streams. The lower mountain slopes are covered by forests. The soil in the plains is fertile, producing wheat and other cereals, flax, hemp, oil, wine, etc. Silkworms are reared, sheep are bred. The growing industries include paper, leather, soap, brandies, liqueurs, machinery, various kinds of carriages, railway material, pianos, beds, glass, bronze, chocolate, jams, woolen and linen goods and foundries. Several railways and a canal connecting the Atlantic and Mediterranean are the chief ways of communication. Pop. about 433,000.

Sarah (Heb. "Princess"), the daughter of Terah, half sister and wife of Abraham, who in her 90th year bore to him a son, Isaac, according to the promise of God. She died in Hebron at the age of 127 years. See ABRAHAM.

Saranac (săr'a-năk) **Lake**, N. Y., village in Franklin and Essex counties; on Lake Saranac, and on a branch of the New York Central & Hudson River and the Chateaugay R.R.'s; about 70 miles south by east of Malone. The village is in a part of the Adirondack region noted for its healthfulness and the beauty of the scenery. The hunter and lumberman settled here in 1860-70, but the railroad brought the health and pleasure seekers in great numbers. In the vicinity are the Trudeau and the Gabriel sanatoria for consumptive patients. The principal public buildings are the hotels, the churches and the schools. The government is vested in a village president and a board of trustees. Pop. (1910) 4,983.

Sarasate, sã-rã-sã'tã, **Pablo de**, Spanish violinist; b. Pamplona 10 March 1844; d. Biarritz 20 Sept. 1908. In the Paris Conservatory he studied the violin under Alard and harmony under Reber. In 1857 and 1859 he won prizes there, and afterward achieved a signal European success. During his second visit to the United States (1889) he added to his already secure reputation by brilliant exhibitions of his skill in the leading cities. The technique which shows his mastery of the violin is made the vehicle of a fine interpretative power revealing the genius of the musician. His own compositions include 'Spanische Tänze,' 'Zigeunerweisen,' national airs, and many fantasias on airs from the opera.

Saratoga, sãr-a-tõ'ga, a lake in Saratoga County in New York State, about four miles east of Saratoga Springs. It is a favorite place for regattas; it has a straight-away course three miles long and is wide enough to accommodate eight racing sculls abreast. In one of the intercollegiate regattas, held here, 16 college crews competed, and had ample room. A steam railroad and electric cars extend from the "Springs" to the lake. In the summer it is a favorite resort for fish and game dinners.

Saratoga Springs (from an Indian word meaning "Hillside of the Great River"), N. Y., village in Saratoga County; on the Delaware & Hudson, the Boston & Maine, the Saratoga & Mount McGregor, and the Adirondack R.R.'s; 38 miles north of Albany and 185 miles north of New York. It is easily accessible

to many of the large Eastern cities, the "Saratoga Special" makes the run from New York in four hours; Boston may be reached in six hours; Albany and Troy, one hour; from Buffalo, Rochester, the Adirondacks, the Green Mountains, the White Mountains, and many other places fast trains are run, especially in the summer season. It is a remarkably healthy place, and all precautions known are used to keep the water pure and the sewerage system free from defects.

The missionaries were the first known white men to visit this region. In 1684 the land now constituting Saratoga and adjacent counties was ceded to the Dutch by the Indians. The first white owner of the now celebrated "Springs" was Rip van Dam, and Sir William Johnson (q.v.) was the first who had the efficacy of the waters tested. In 1774 the first hotel was erected. The "Springs" have made for the place a world-wide reputation. Thousands come to this village, each year, to use the waters, making the village one of the most popular health resorts in the country. Since 1826 the waters have been bottled and sent to various parts of the world. The Saratoga battle-field, the scene of the surrender of Burgoyne to Gates, 17 Oct. 1777, is 12 miles east of the village.

Saratoga is on the southernmost spur of the Adirondacks, at an elevation of more than 300 feet above tide-water. The region around has practically no swamps, nor marshes; the rainfall is moderate, and the winters cold, the summers mild and pleasant. There are but few manufacturing establishments, and the region around is composed largely of productive farms. The mineral springs are about 50 in number, 40 of which are well known. The most frequently visited and the waters of which are most extensively used, are the Congress, Vichy, High Rock, Victoria, Adirondack, Hathorn, Star, Empire, Patterson, Re-Me-Ho, Royal, Red, Magnetic, Columbian, Geyser, and Excelsior. The waters are cathartic, tonic, alterative, and diuretic. The springs are in three groups; one about a mile south of the village, one a mile north of the village and the largest number within the corporate limits. The Saratoga Racing Park is a mile from the centre of the village. A paved sidewalk leads to the entrance gates. Polo Park, the golf links grounds, and other grounds furnish opportunity for outdoor sports. Saratoga Lake (q.v.) is about four miles distant.

The principal public buildings are Convention Hall, which will seat 5,000 and which cost \$100,000; the town hall containing the theatre, a State armory, and the hotels. The hotels of the village have on several occasions accommodated 40,000 guests. On account of its spacious hotels and its convention halls, it is a favorite place for conventions. There are 18 church buildings, representing eight different denominations. The educational institutions are the Temple Grove Seminary, a high school, public and parish elementary schools, several private schools, a public school library, the McMillan Reading Circle Library, the Athenæum, and the Temple Grove Seminary libraries. The charitable institutions are the Saratoga and Saint Fath hospitals, Home of the Good Shepherd, Saint Christina Home, and the Children's Home.

The two national banks have a combined

SARATOGA — SARAWAK

capital of \$225,000 and a surplus of \$200,000. The annual receipts and expenditures are each about \$125,000. The hotels expend during the summer season about \$40,000 for orchestral music. The village expends a large amount on the streets, keeping them clean and in good repair. Pop. (1910) 12,693.

Saratoga, The, a former wooden sailing ship of the United States navy; displacement, 1,025 tons. Sailing ships of this class are fast disappearing from the navies of the world, but for training the young apprentice into an able-bodied man-o'-war's man there is no better school.

Saratoga, Battles of, two battles of the American Revolution, called also the battles of Bemis' Heights, or of Stillwater, fought on ground about 12 miles east of Saratoga Springs and near the Hudson River. Both battles were fought under the same officers, the Americans being commanded by Horatio Gates (q.v.), who was ably served by Benedict Arnold and Daniel Morgan (qq.v.), and the British by John Burgoyne (q.v.). The first battle, 19 Sept. 1777, was indecisive. Burgoyne, having crossed the Hudson on the 13th and 14th, and encamped on the heights and plains of Saratoga, confronted Gates' army on Bemis' Heights at Stillwater, which the Americans had strongly fortified. About 4 P.M. on the 19th the American left wing, under Arnold, was attacked by Burgoyne's right. The engagement lasted until dark, and both sides claimed the victory. The British held the field, but Burgoyne had failed in his attempt to flank the American position. The British loss was more than 500 men, while that of the Americans was under 400. Burgoyne, whose communications with Canada were cut off, was now placed in peril through the capture of his supply-boats by Lincoln in his rear. Having reason, however, to expect that Sir Henry Clinton would come up the Hudson to his assistance, he fortified his position and waited. But in view of the non-arrival of Clinton, of the shortness of his own supplies, and of the difficulty of retreat, Burgoyne was forced to risk another battle. Advancing, 7 October, with 1,500 men and six pieces of artillery, he was attacked on the right by Morgan's riflemen and a New Hampshire brigade, while Arnold, without orders, and in defiance of Gates, pressed to the front and assumed actual command of the Americans, leading them in a determined assault upon the British lines. The Americans were reinforced at the critical moment, the British again and again gave way, and the battle ended in their retreat with loss of their artillery. In this engagement the British general Simon Fraser was mortally wounded, and Arnold received a severe wound in the leg. The Americans, animated by success, pursued Burgoyne's men, assaulted furiously, and gained partial possession of their camp. This battle, like the first, ended with darkness. During the night, while the American forces lay on their arms, Burgoyne withdrew to the heights in his rear, not far to the north, and on the following day, to avoid capture, he retreated to Saratoga. After vainly waiting again for aid from Clinton, being still nearer the end of his provisions, exposed to the American fire, and finding further retreat impracticable, Burgoyne proposed a cessation of hostilities. He refused

Gates' demand for unconditional surrender, and Gates modified the terms, which finally provided that the British should march out with the honors of war, and should freely take passage for England, on condition of not again serving against the American army. Congress failed to ratify this agreement, and the captured British, with the exception of Burgoyne and a few other officers, were held as prisoners until the end of the war. The troops surrendered numbered 5,791. An artillery train of 42 guns, more than 4,500 muskets, and a great quantity of ammunition were taken, and this war-material proved of no small value to the American cause.

JOHN H. CLIFFORD.

Saratov, sā-rā'tōf, Russia, (1) Capital of the government of the same name, on the Volga, 459 miles southeast of Moscow, in a fertile valley, surrounded by lofty hills. It is one of the most important and best-built cities of eastern Russia. It occupies terraced slopes, intersected by ravines, dividing the city into three parts. It contains 30 churches, besides a public library; a fine art gallery; an excellent theatre; a school of drawing; primary and technical schools, and is the seat of several important courts and public offices. There are manufactures of cordage, bells, pottery, tiles, soap, tobacco, textiles, etc. The trade is chiefly transit by the Volga, between Moscow and Astrakhan. The industrial works comprise flour-mills, iron and oil works, works for the manufacture of railway plants, and tobacco factories. There are extensive distilleries and manufactures of liqueurs. Agriculture and gardening are the chief occupation of a section of the population. Pop. about 140,000.

(2) A government of southeast Russia, on the Lower Volga, with an area of 32,624 square miles. The surface is diversified by numerous hills with intervening valleys and many streams, which with a mild climate and good soil contributes to rich pastures and munificent crops. There is a scarcity of timber. The chief exports are corn, hemp, flax, tobacco, hops, and madder. The mulberry is cultivated for rearing silkworms. Most of the inhabitants are Russians, although there are many Finns, Tartars, and Germans, etc. The colonists have much improved industry by their labor and example. Pop. about 2,500,000.

Saravia, sā-rā'vē-ā, Philippines, pueblo, province of Negros Occidental; on the Malalag Grande River, two miles inland; 16 miles north of Bacólod. It is a military station. Pop. 15,000.

Saravoff, sā-rā'vōf, Boris, Bulgarian soldier, leader in the Macedonian revolutionary committee: b. Turkey about 1870. He studied in the military academy at Sofia, obtained a lieutenant's commission in the 1st Bulgarian infantry, in 1895 resigned his commission to devote himself to the cause of the Macedonian revolutionists, and performed many daring exploits in that service. His movements were regarded in Europe with some apprehension, for it was asserted that his design was to organize a great rebellion, seize Constantinople, and become dictator of a new Macedonian state. His death was frequently reported in the press.

Sarawak, sā-rā-wāk', Borneo, East Indies, an independent state, governed by an Englishman with the title of Rajah, and now under

SARBIEFSKI — SARCOPHAGUS

British protection. It is situated on the north-western side of the island, and its coast extends from Cape Datu on the southwest to Brunei Bay on the northeast, having a length of about 400 miles; the inland boundary is mainly formed by the Dutch territories, while in the northeast is the independent sultanate of Borneo proper, also now under British protection. The area of Sarawak is about 50,000 square miles and the population about 500,000. The shore is generally low and undulating, but immediately behind it the ground rises rapidly and becomes mountainous. The principal rivers are the Rejang, Bararam, Batang, Lupar, and the Limbang. The climate is equable. The soil is very productive, and sugarcane grows readily even without cultivation. Cloves, nutmegs, and cinnamon thrive well; the more important vegetable productions are cocoanuts, rice, and sago. Metals, particularly gold, antimony, and nickel, are very abundant, and are worked to a considerable extent. Diamonds and other precious stones are also found, and excellent coal, favorably situated both for working and shipping. The original inhabitants are Dyaks, but are now intermixed with Malays and Chinese. They had made considerable progress in civilization. Owing to misgovernment and marauding expeditions for the purpose of obtaining slaves and other plunder they were in a wretched condition till Sir James Brooke was appointed rajah by the Sultan of Borneo in return for distinguished services in quelling disturbances and restoring order. Under his mild yet vigorous administration a happy change was produced, and extended its benefits beyond Sarawak to the adjoining territories. Sir James Brooke, who died in 1868, was succeeded by his nephew, Sir Charles Brooke. The exports consist chiefly of gutta-percha, sago, edible birds' nests, and antimony, of which last article 2,000 tons are annually shipped to Singapore.

The seat of the government is at Sarawak (formerly called Kuching), on a river of the same name. It consists of a native and a European town; pop. est. 25,000. A six-gun battery commands the reach immediately below the town, and there a number of Chinese houses have been built. The trade of the town is considerable, and is carried on chiefly in large boats, some of them of 100 tons, which sail annually to Singapore with sago and other productions of the coast, receiving in exchange European goods, Javanese cloths, brass-work, and coarse earthenware, made in China.

Sarbiefski, Matthias Casimir (Latinized into *SARBIEVIUS*), Polish Latinist: b. on his father's estate of Sarbiefo, in Massovia 1595; d. Warsaw 2 April 1640. He was teacher in the Jesuit school at Wilna and in 1623 went to Rome where Pope Urban VIII. crowned him as poet and engaged his services for providing the hymns of the revised breviary. On his return to Poland he was appointed court preacher to Vladislaw IV. His Latin poems consist of odes, epodes, dithyrambs of such matchless grace and faultless style as justly won for him the title of the 'Polish Horace.' The whole of his works were published in Antwerp (1632); and by Friedemann in the 'Bibliotheca Poetarum Latinorum' (1840), with a German translation.

Sarcey, sâr-sâ, Francisque, French journalist and dramatic critic: b. Dourban, 8 Oct.

1828; d. Paris 15 May 1899. After several years spent in general journalistic work he became dramatic critic for 'Le Temps' (1867), and in this position, which he held until his death, was a dictator of dramatic criticism, his word being accepted as final by a large part of the public. He was the author of 'The Word and the Thing' (1862); 'Le Siège de Paris' (1871), which reached 30 editions in its first year; 'Etienne Moret' (1875); 'Comédiens et Comédiennes' (1878-84); 'Souvenirs de Jeunesse' (1884); 'Souvenirs d'Age mûr' (1892); 'Quarante Ans de Théâtre' (1893).

Sarcina, sâr-sî'na, a genus of microscopic fungi, consisting of cubic or prismatic masses, made up generally of 8, 16, or 64 rounded, cubic cells, the faces of each cell being divided into four frustules or projections by two light grooves which cut each other at right angles. Each cell has a diameter of about $\frac{1}{100}$ th to $\frac{1}{125}$ th of a line, and consists either of a completely homogeneous mass only, without nucleus or granulations, or of such a mass with four, sometimes two or three nuclei. The cells are separated from each other by rectangular striæ. *Sarcinæ* are found sometimes in considerable quantities in the vomitings of persons ill with chronic affections of the stomach, in the fæces of chronic diarrhoea, etc.; they have likewise been detected in the stomachs of rabbits, dogs, tortoises, and other animals; in the urine; in the pus of gangrenous abscesses; in the bones, etc. The appearance of *sarcinæ* in vomitings indicates a particular form of dyspepsia, for which the best known remedy is sulphate of soda, 10 grains to 1 dram, dissolved in water, and taken soon after a meal. The genus *Sarcina* is closely allied to that of *Bacterium*.

Sar'cine, hypoxanthine, $C_8H_{10}N_4O$, a weakly basic organic substance closely related to xanthine and to uric acid. Found in the muscle juice and in many other fluids of the body. Colorless crystalline needles, slightly soluble in cold water, more so in hot. Unites with acids and certain metallic oxides to form compounds many of which are crystalline.

Sarco'ma. See TUMOR.

Sarcoph'agus, originally the name given to a kind of stone that used to be quarried at Assos in the Troad, and which was employed for coffins or tombs: a coffin made of this stone was supposed to possess the property of consuming within a few weeks a dead body laid in it: in Greek *sarkophagos* means flesh-consuming, or flesh-devouring. *Sarcophagus* is now used only in the sense of coffin or tomb made of stone, or of terra-cotta as in the case of the highly ornate tombs of that material which are found among the remains of ancient Etrurian art. Some of the sarcophagi found in Egypt are contemporary with the pyramids: the earliest are squared or oblong, the later ones, whether plain or ornamented with reliefs, have the same shape as the swathed mummies. Phœnician sarcophagi were modeled like the mummiform sarcophagi of Egypt, and were of marble or basalt; some of them showed the principal contours of the body. Before cremation of the dead came into general use at Rome, the illustrious dead were deposited in massive sarcophagi; celebrated among these is the tomb of the Scipios; under the empire Roman sarcophagi

SARCOPSYLLA—SARDINES AND SARDINE FISHERIES

were very elaborately ornamented after the manner of the Etrurians. In modern times deceased men of great eminence or great wealth are sometimes laid away in stone chests or sarcophagi.

Sarcopsylla, a genus of parasitic fleas which bury their heads in the flesh of their hosts and create bad sores. The most noted species is *S. penetrans*, the chigoe (q.v.). Another species, the chicken-flea (*S. gallinacea*), buries itself in the eyelids of domestic fowls in our southern States and elsewhere.

Sarcosine; methyl glycocoll, methyl glycine, $\text{CH}_2\text{NHCH}_2\text{COOH}$, a substance discovered by Liebig in the decomposition product of the creatine obtained from meat extract. Later made by the action of methyl-amine on monochloro-acetic acid. A colorless crystalline compound easily soluble in water.

Sard, a translucent, reddish-brown variety of chalcedony, extensively used as a ring-stone. See CARNELIAN.

Sardanapalus, sār-da-na-pā'lūs (ASSURBANIPAL) Assyrian king, ruled 668-626 B.C. He was the eldest son of Esarhaddon, grandson of Sennacherib, and great-grandson of Sargon. His father resigned the throne to him in 668 B.C., reserving only Babylon to himself. The following year the father's death left Assurbanipal sole ruler. Revolts being common upon a change of rulers, the attention of the new Assyrian king was called to the suppression of one in Egypt, where Tirhakah of Ethiopia had overthrown the system of princes tributary to Assyria. Tirhakah was driven southward out of Egypt after a disastrous battle, but his successor renewed the revolt and met with defeat. Thebes was robbed of an immense amount of treasures of art and wealth. Tyre also revolted, but after a prolonged blockade its king submitted. The kings of Arvad, Cilicia and Tabal were put in subjection, and Gyges of Lydia, who besought an alliance with Assurbanipal to aid him against his Cimmerian enemies from the Black Sea region, found he was accepted on terms which implied submission; and when later he assisted Psammetichus in throwing off the Assyrian yoke in Egypt he was destroyed by Assurbanipal. War broke out with Urtaku, king of Elam, who had made a raid upon Accad, ruled by the brother of the Assyrian king. It took a long struggle to complete the subjection of the country but was accomplished finally during the reign of Teumman, Urtaku's usurping successor. After a great victory near Susa, Urtaku's sons were placed over the kingdom as Assyrian vassals. The decline of the empire began when the king's brother, Samas-sum-ukin (or Shamash-shum-ukin), ruler of Babylon, as vassal-king, instigated a revolt which was so widespread as to include Elam, Arabia, Egypt, Chaldaea and other Asiatic countries. Egypt alone under Psammetichus secured her independence. Babylon was taken after a long siege and Samas-sum-ukin perished in the flames of his burning palace. Elam was subjugated and Susa, after being pillaged, was razed to the ground between 646-640 B.C. Assurbanipal celebrated his victories in Arabia by a triumphal procession through Nineveh.

Assurbanipal figures in classical literature under the name of Sardanapalus and there is

described as a mere sensualist. Though cruel and implacable to foes, he was an enlightened despot, and literature and art, particularly architecture, flourished in his reign and attained their highest degree of perfection. The king collected a famous library of all the known cuneiform tablets. The remains of his splendid palace with its priceless library were excavated at Kuyanjik. The tablets now belong to the British Museum, and form the basis of our present knowledge of the civilization and history of Assyria. Consult: Oppert, 'Histoire des Empires de Chaldée et d'Assyrie'; Lenormant, 'Manuel d'Histoire Ancienne de l'Orient' (1869); Rawlinson, 'Five Great Monarchies of the Eastern World' (1879); and the works cited of A. H. Sayce (q.v.).

Sardines (sār dēnz') and **Sardine Fisheries**. The name sardine is a general one applied to various small fishes of the family *Clupeidae* as well as, and less correctly, to the young of some of the larger species. "Thus, there are the Spanish sardine of the West Indies and Florida; the California sardine, found along the entire west coast of the United States; the Chile sardine; the oil sardine of India, and the sardines of Japan and New Zealand. But the sardine *par excellence* is the French sardine, so-called from the island of Sardinia, in the Mediterranean, about whose shores the fish are abundant." The sardine or pilchard (*Clupea* or *Clupanodon pilchardus*) is usually about 5 or 7 inches long, of an olive-green color above and silvery on the sides and below, with very large easily displaced scales, only about 30 of which form a complete longitudinal row. The usual French sardines are the yearling fish of what becomes, when full grown, the pilchard of English fishermen, attaining a length of 8 to 10 inches. Geographically it ranges throughout the Mediterranean; in the Atlantic from Madeira to Ireland and in the North and Baltic Seas. They feed on minute crustaceans, larval forms, and floating fish-eggs, the only kind of food for which their nearly toothless mouths are adapted. The pilchard spawns throughout the summer in the open sea, laying about 60,000 buoyant eggs. On the coast of Brittany, where the principal fisheries are located, sardines are now caught throughout the summer, and to a less extent at other seasons, exclusively by means of gill-nets of very fine twine and small mesh which varies, however, to suit the size of the run of fish. They are dyed blue, partly to preserve, partly to render them inconspicuous in the water; and the schools of fish are tolled into them by means of a bait made of the salted roes of various fishes, chiefly cod. The nets are operated from small two-masted boats which never go beyond a few miles from the shore. The catch is brought ashore and a portion is consumed fresh, but the bulk is sold to the canning factories.

The fishes, when bought for curing, are first beheaded and then gutted, and sorted according to size. They are then washed in sea-water, by women, who are said to earn at this work from 12 to 20 francs per week. The fishes are next dried by being suspended on wire screens, nets, or willows in the open air, and are then plunged into a cauldron of the purest olive-oil, which is kept boiling over a furnace. For the cheaper grades peanut or cottonseed oil is used. The sardines are laid in the cauldron on wire

SARDINIA

gratings, two rows deep, and are kept therein until sufficiently cooked, when they are taken out and allowed to drip, the oil-drippings being carefully collected. They are packed in the tin cases, which are filled with oil, and sealed hermetically. Throughout the process the greatest care is exercised to keep the fish in the best condition. The offal and waste of the sardine-curing industry is sold as manure to the farmers.

The sardine fishery is the most important fishery industry of France, employing about 32,000 fishermen and more than 8,000 boats, and yielding an annual product of about 60,000,000 kilograms of sardines, valued at about 9,000,000 francs. About 15,000 persons are employed in the canning factories, of which there are upward of 100, some of which have an annual output of 4,000,000 or 5,000,000 boxes. The better grades are consumed in France, but the United States imports French sardines, chiefly of the cheaper grades, to an annual value of about \$1,000,000. Sardines are also packed to a smaller extent elsewhere in Europe, especially in Spain and Portugal.

In the United States a true sardine (*C. caruleus*) occurs on the coast of California and, judging from the results attained in the canning of small quantities, it promises to rival the French product in delicate flavor and industrial importance. But the principal sardine industry of the United States centres about Eastport, Maine, where the young of the herring is packed. These fish are caught chiefly in brush weirs (see POUND-NET FISHING) and are sold to the canneries, where they are treated in general after the French method with some local modifications. Drying rooms or ovens are employed in place of the open air; when ovens are used the fish are not boiled in oil, but are at once sealed; cottonseed-oil is almost universally employed instead of olive-oil; and various labor-saving devices have been introduced. The product is distinctly inferior to the best or even middle-grade French sardine. Various special grades, put up in mustard, tomato sauce, and spices, are also packed. The output of the 45 canneries in Maine is about 550,000 cases, valued at about \$2,000,000, annually.

Consult: Hall, 'Herring Fisheries of Passamaquoddy Bay,' Rep. U. S. Fish Com. for 1896; Stevenson, 'Preservation of Fishery Products for Food,' U. S. Fish Com. Bulletin for 1898; Smith, 'The French Sardine Industry' (1901); 'Statistiques des Pêches Maritimes,' Paris; Cunningham, 'Natural History of Marketable Marine Fishes' (London 1896). See HERRING.

Sardinia, sâr-dîn'î-a, Island of (Italian, SARDEGNA), in the Mediterranean Sea, south of the island of Corsica, from which it is separated by the Strait of Bonifacio, not quite 7 miles wide, extends between lat. 38° 50' to 41° 15' N., and lon. 8° 5' to 9° 50' E. It is 152 miles long from Cape Teulada in the south to Longo Sardo in the north, and has a central breadth of about 66 miles. Its total area is 9,306 square miles divided into two provinces of the kingdom of Italy (q.v.), Cagliari and Sassari, the former comprising the districts of Cagliari, Iglesias, Oristano, and Lanusei, and the latter those of Nuoro, Alghero, Ozieri, Sassari, and Tempio, named after the principal urban aggregations. Cagliari is the capital. Before the consolidation

of the Italian kingdom in 1861, Sardinia with its surrounding islands, the principal of which are San Antioco, San Pietro, Asinara, Madalena, Tavolara, and Caprera formed that part of the Sardinian states named the Kingdom of Sardinia. See SARDINIAN MONARCHY.

Topography.—The island is nearly in the form of a parallelogram. In a prehistoric age it was united with Corsica. The interior is generally mountainous, the great chain which traverses Corsica from north to south being evidently, notwithstanding the interruption of the Strait of Bonifacio, continued into Sardinia, where it usually follows the same direction, but occasionally sends out transverse branches east to west. The culminating point is the peak of Genargentu, situated a little to the east of the centre of the island, which attains the height of 6,132 feet. The next highest summit is the peak of Limbarra, 4,330 feet, belonging to the transverse range of that name, and situated in the north. Several other summits reach from 3,000 to 4,000 feet. Between the mountain ridges are several extensive plains, of which the most celebrated for beauty and fertility are those of the Campidano in the south, stretching between Cagliari and Oristano, and of Ozieri in the north. Besides these there are several large sandy or stony districts called *macchie*, of a very sterile nature. The streams are numerous, and add considerably to the fertility of the districts through which they pass, but are of no navigable importance. The Tirso, the largest, pours its waters into the Gulf of Oristano on the west coast. Next to it are the Coguinias, which flows northwest into the Gulf of Porto Torres or Asinara; the Flumendosa, which pursues the earlier part of its course between two mountain ridges, turns southeast, and discharges itself on the east coast; and the Mannu, which falls into the Gulf of Cagliari. The lakes are situated chiefly in the vicinity of the coast, where they form a series of lagoons. Sardinia has a total coast line of 835 miles. The north coast is generally rugged and precipitous, presenting a succession of bold headlands. The principal bay is that of Porto Torres, in the Gulf of Asinara, having a low beach, with lagoons extending along its eastern and southern shores, but rising toward the west into precipitous cliffs, terminating on the mainland in Cape Falcone, and thereafter continued north in the long and rugged island of Asinara. The west coast, stretching south from Cape Falcone, continues steep and rugged, and presents, among other remarkable headlands, that of Cape Argentiera, forming the extremity of a rocky mountain upward of 2,000 feet high; beyond this the coast turns suddenly east, and forms the Bay of Alghero, where the beach becomes lined with hills of fine white sand. To the south of Alghero the sand disappears, and a range of gentle hills, planted with vineyards, lines the shores as far as Poglina, when the coast again resumes its rocky character, presenting a succession of trap cliffs, which extend to Cape Marargiu, and thence to Point Mova, near the town of Bosa. A table-land succeeds, and is continued, though with occasional interruptions, as far as Cape Mannu, a cliff of moderate height. The beach now lowers, and trending east, forms the large and nearly semicircular expanse of the Bay of Oristano, the northern and southern

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extremities of which, Capes San Marco and La Frasca, are above five miles apart. Rocks again appear toward Cape La Frasca, and continue with little interruption to Cape Pecora, from which the coast trends along the base of Monte Ferru to Point Rama, where a remarkable conical rock, called Pan di Zucchero, comes into view. A large open bay, called Porto Paglia, succeeds, and beyond it the coasts become lined by a group of islands, of which Saint Pietro and Saint Antioco form, with their opposite coasts, a spacious harbor, with safe anchorage in every wind. Between the east coast of Antioco and the mainland is the Gulf of Palmas, the northern shore of which consists of a succession of flat islets, which often join at low water, while its southern extremity, after presenting the bare and sloping promontory of Point Piombo, terminates in the still more remarkable headland of Cape Teulada, nearly 900 feet high, and forming the most southerly point of the whole island. A bay of the same name opens between this headland and Cape Spartivento. Turning north from Cape Spartivento a number of rocky islets present themselves, lining a low and marshy beach, which continues almost unbroken till the Island of San Macario is reached, forming the southwest entrance of the Gulf of Cagliari. This gulf, extending from Cape Pula on the west to Cape Carbonara on the east, a distance of about 24 miles, and stretching inland for nearly 12 miles, is in many respects the most important of the island. Besides having the capital situated on its northern shore, it everywhere furnishes excellent anchorage in ample depth, and in the grounds along and behind it exhibits the best specimens of cultivation of which Sardinia can boast. The east coast, from Cape Carbonara northward, stretches nearly in a straight line, the continuity of which is seldom interrupted by indentations. The only bays deserving of notice are those of Orosei and Terranova. The coast-line presents similar features to those which have already been described, low beaches and rocky cliffs often succeeding each other within very short distances. The most conspicuous of all the headlands is that of Monte Santo, a rugged promontory upward of 2,400 feet high, sloping toward the sea, and terminating in bold precipices of limestone, within which is an extensive cave fantastically adorned with enormous milk-white stalactites.

Geology.—The greater part of the rocks are of crystalline texture, and belong to the earliest formations, consisting of granite, overlain by gneiss and mica-schist. Trachyte, basalt, and other rocks of volcanic formation are most largely developed in the northwest, but also occupy a great number of isolated spots throughout the island, and more especially in the southwest, where the adjacent islands of Saint Pietro and Saint Antioco are almost entirely composed of them. In many cases the mouths of ancient craters and the lava-streams issuing from them can be distinctly traced. Sedimentary Silurian rocks break the continuity of the granite on the east, and a large tract in the southwest belongs to the same formation, extending in a southwest direction till it reaches the southern extremity of the island and forms the remarkable promontory of Teulada. The limestones and chalks at the top of the secondary formation are not largely developed, but occupy a number of iso-

lated tracts both in the interior and on the coast. In the latter portion they form conspicuous objects in the northwest, where the cliffs to the north of the Gulf of Alghero are composed of them, and in the east, where they form the great mass of Monte Santo, and contain its celebrated stalactical cave. Tertiary rocks of travertine, marl, and sandstone occupy a considerable tract near the town, and along the Gulf of Sassari, and also in the south, where they form the eastern boundary of the plain of Campidano. That plain itself, however, has a deep covering of alluvium, which partly accounts for its remarkable fertility. Similar tracts of alluvium, though of much more limited extent, are found in the Plain of Ozieri in the north, and along the Gulf of Palmas in the south, and that of Paglia in the southwest.

Minerals.—The mineral riches of the island were well known to the ancients, whose extensive workings can still be traced. Tradition enumerates gold among its metals, but no traces of it can now be found. Lead, however, exists in considerable abundance, and is generally highly argentiferous. Mines of it are profusely scattered over various districts. Zinc ore (calamine) is worked, and as well as lead ore is exported. Copper occurs in several quarters, and occasionally furnishes beautiful specimens of malachite. Quicksilver has been found, and was once partially worked; and both bismuth and antimony are said to exist; iron of excellent quality is plentifully distributed, and is worked in several districts. The other mineral products deserving of notice are porphyry, basalt, alabaster, marble, volcanic enamels, rock-crystals, and a variety of beautiful pebbles, lignite, gypsum, and nitre. Salt, in its mineral form, is found only in the grottoes of Serrenti, but is extensively obtained from the salt-pans along the coast, and forms one of the most profitable sources of royal revenue, for the sake of which it is strictly maintained as a government monopoly.

Climate.—The climate of Sardinia has for many ages borne a very bad name; at certain seasons large districts become so insalubrious as to be regularly deserted by their inhabitants, while in others the mortality is remarkably great. The range of the thermometer is between 34° and 90°, and the mean annual temperature 61° 7'. Hence neither heat nor cold can be said to be in excess. During the hot season, in the low-lying lands, miasmata are continually arising to taint the air, the malignant properties of which become so virulent at night or in the cool of the evening that the natives never quit their homes until an hour after sunrise, and hasten to return before sunset, carefully closing every door and window. The disease which then prevails is known by the name of *intemperie*, and is said to be even more fatal than the malaria by which parts of Italy and Sicily are infested.

Flora and Fauna.—The whole surface of Sardinia has been divided into three portions—one occupied by mountains, which, where not absolutely barren, are covered with forests or clothed with pasture; one occupied by marshes, lagoons, and the almost sterile *macchie*; and one under tolerably regular culture, as arable land, olive-yard, vineyard, etc. See paragraph on *Agriculture*.

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Game of all kinds is very abundant. Wild boars, stags, deer, and muffsions frequent the woods and forests; and foxes, hares, and rabbits are so numerous that their skins furnish a considerable article of export.

Fisheries.—From the extent of seacoast the fisheries naturally form an important branch of industry, which, however, is almost entirely in the hands of strangers. The most valuable fishery is that of the tunny, which is carried on extensively on various parts of the coast. Anchovies and sardines, the latter at one time so numerous as to have derived their name from the island, have become comparatively scarce. Fine mullet, bream, eels, and other fish abound, and are staple articles of consumption and commerce. The coral fisheries, more celebrated in ancient than in modern times, are still carried on on the western and southern coasts, where they employ from 200 to 300 boats, which arrive annually from Naples and Genoa. The *Pinna nobilis* also, the inhabitant of a shell of from 15 inches to 27 inches in length, abounds in the smooth water of shallow bays, as at Porto-Conte and Liscia, and becomes the object of an important fishery, partly on account of the pearls, generally of very indifferent quality, obtained from it, and still more on account of its byssus, or tuft of silky hair, which is about eight inches long, and is spun into gloves, stockings, or other articles of dress.

Ethnology.—The inhabitants resemble the Spaniards rather than the Italians in character. Their demeanor is grave and dignified compared with the vivacity of the Italians, and they are characterized by their unwavering fidelity to their sovereign, their chivalric sense of honor, and their hospitality. They suffered much, however, from long neglect and misgovernment, are ignorant and bigoted, and when they have received an injury are insatiable in their thirst of revenge, the celebrated blood-feuds being still by no means uncommon. With the exception of the inhabitants of Cagliari and Sassari, the two chief towns of the island, the Sardinians have as yet been little influenced by the modern advances of civilization, and in some remote districts the traveler may imagine himself transferred to a period several centuries earlier.

Agriculture.—Much of the land is of remarkable fertility and though, from the imperfect system of agriculture pursued, the average produce does not exceed one in seven or eight, a return of 15 to 20 in some favored districts is not uncommon. The grain thus raised considerably exceeds the consumption of the present inhabitants, and might easily be increased so as to supply three times the number. The whole operations of the farm are conducted in the most antiquated and slovenly manner. The principal crop is wheat, which is generally of excellent quality, and forms an important article of export in the form not only of grain but of flour, biscuit, and macaroni. The culture of barley is more limited, and the quality of the produce is comparatively inferior; maize thrives well, and though not yet a general crop is rising rapidly into favor; beans and pease are extensively grown both for home consumption and export. The vine is well adapted both to the climate and the soil. The produce, however, is more remarkable for its quantity than its quality, all the preparatory processes being conducted in

a careless and imperfect manner. The most esteemed wines are those of the Campidano, Alghero, Sorso, and Ogliastro. Beautiful and extensive olive-grounds are met with in various quarters, but the culture might easily be extended and made much more profitable than it has yet proved to be. The best oil is that of Sassari. The only other crops deserving of notice are tobacco, which is grown to some extent in several districts, but particularly around Sassari, Alghero, and the adjacent villages; linseed, which is produced in the greatest abundance in the neighborhood of Oristano; cotton, for which the soil and climate of the Campidano appear well adapted; madder, which grows wild in many parts of the island, and, though neglected, might easily be cultivated to great advantage; and silk, well fitted to become a staple product, but at present produced chiefly for amusement.

Industries and Commerce.—Manufactures have made very little progress, and are chiefly confined to a few coarse tissues woven by the women at their homes for private use. Tobacco and gunpowder, both, like salt, government monopolies, are manufactured to a considerable extent. The trade consists of the exports of raw produce, the greater part of which have already been enumerated, including corn, wine, brandy, timber, seeds, fish, cattle, lead ore, calamine, salt, tobacco, etc.; the imports include all the ordinary tissues, more especially cotton, colonial produce, hosiery, hardware and metals, hemp and cordage, etc. One great obstacle to the progress of trade was the miserable state of the roads, which long continued impracticable for wheel-carriages. This has been to some extent removed by the formation of a good road, which traverses the island throughout its whole length from Cagliari to Sassari, and of several branch roads to the most important places not on the direct line. Several railways have also been constructed. The coinage, weights, and measures are the same now as those on the mainland.

Language, Education, Religion, Government, etc.—The language consists of a number of dialects differing widely in many of their roots; several of them closely resemble Spanish. It has been estimated that only about eighty in the thousand of the inhabitants are able to read and write, so defective is the state of education, but a steady improvement is being maintained with the rising generation. The people are Roman Catholics. Sardinia now has a provincial government similar to the rest of Italy.

History.—The early history of the island is involved in much obscurity. Its original inhabitants, according to Cicero of Libyo-Phœnician, and according to Strabo of Tyrrhene extraction, were living independent when, about 530 B.C., they were attacked by the Carthaginians, and obliged, after a valiant but ineffectual resistance, to quit the low country and retire into their mountain fastnesses. During the first Punic war the Romans made strenuous exertions to become masters of the island, and ultimately, on agreeing to make peace, obtained a formal cession of it from the Carthaginians. This cession is mentioned by Livy as one of the causes which led to the second Punic war, in which Rome, though finally victorious, was brought to the brink of ruin by Hannibal. Dur-

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ing the struggles between Rome and Carthage Sardinia often became the theatre of war, and suffered equally from both the powerful states which contended for its possession. At a very early period the inhabitants were converted to Christianity. They passed successively into the hands of the Vandals, the Goths, the Longobards, and Saracens. By the united efforts of the Genoese and Pisans the Saracens were ultimately expelled from the island, and then rival claims were set up for it by its liberators themselves. During the disputes that ensued some of the judges or governors succeeded in establishing themselves as independent princes. In 1207 Boniface VIII. invested the kings of Aragon with Sardinia, and it continued in the possession of Spain till 1708, when it was taken possession of by the British. In 1713, in terms of the Peace of Utrecht, it was yielded to Austria. In 1720 it was ceded by Austria to Victor Amadeus II., Duke of Savoy, in exchange for Sicily. The Duke of Savoy thereafter assumed the title of king of Sardinia, which was finally exchanged in 1861 for that of king of Italy. The population is estimated at 850,000, giving a density of nearly 86 per square mile. About 480,000 of the inhabitants are males.

Sardinian Monarchy, a former south European kingdom, comprising Sardinia (q.v.) and its surrounding islands as the nucleate portion with several dependencies on the Continent which included the duchy of Savoy, whence came its kings; the principality of Piedmont; the county of Nice; the duchy of Genoa, and parts of the duchies of Montferrat and Milan. These latter were divided for administrative purposes into eleven divisions—Turin, Genoa, Chambéry, Alessandria, Coni, Novara, Nice, Annecy, Ivrea, Savona, and Vercelli. Previous to the annexation of its territories consequent on the events of 1859 (see ITALY), and the disjunction from it of the duchy of Savoy and the county of Nice, which, in the same year, were ceded to and now form part of France, it comprised in the whole an extent of 28,229 square miles, with a population in 1858 of 5,194,807. In 1860 the revenue was estimated at 149,343,441 francs or \$29,868,688, and the expenditure at 157,805,376 francs or \$31,561,075. The national debt on 1 Jan. 1858 amounted to 677,020,228 francs or \$135,404,046. The army in 1859 numbered 76,172 men, exclusive of the reserve; and the fleet consisted of 29 ships with 436 guns. A new constitution was voluntarily granted by Charles Albert in 1848. It appointed two legislative chambers, guaranteed the freedom of the press, and introduced many important reforms. The Roman Catholic was the religion of the state, but all other forms were tolerated. The last Sardinian king was Victor Emmanuel II., afterward king of Italy, who succeeded to the throne in 1849. The royal title was King of Sardinia, Cyprus, and Jerusalem, and Duke of Savoy. The crown-prince was styled Prince of Piedmont.

History.—The country which formed the Sardinian states was known in ancient times in its southern part by the name of Liguria, and in its northern part, bounded on the north by the Pennine, and on the west by the Graian and Cottian Alps, by the name of Gallia Cisalpina.

Savoy, separated from the other parts, and lying beyond the Alps, was considered as belonging to Gallia Narbonensis. From this remote corner of the territory sprang the present royal house of Italy. In the middle of the 11th century, Humbert, count of Maurienne, a great vassal of Rudolf III. of Burgundy, appears exercising jurisdiction not only over Maurienne, but various other parts of Savoy, the Lower Valais, and Aosta. This jurisdiction was extended to the banks of the Po by Humbert's son, Otho, who died in 1060, leaving two sons, who became successively counts of Savoy. Under Amadeus III., a long series of changes followed, during which the house of Savoy was sometimes brought to the verge of destruction, and at other times attained to such prosperity as to excite the jealousies or fears of neighboring states. One of the counts, called Peter, ruled from 1263 to 1268. He added the canton of Vaud to his dominions, and in many ways improved the fortunes of his house. Henry III. of England, who had married his sister, made him Earl of Richmond, and gave him for residence a palace on the banks of the Thames, which hence took the name of Savoy House. Among Peter's successors the most distinguished are Amadeus V., whose prosperous rule, from 1284 to 1323, procured him the title of Great. Amadeus VIII. at the termination of his long reign of 49 years, in 1440, left his successor in possession of territories which gave him a distinguished place among the sovereigns of Europe. Being, however, interposed between France and Germany, they were often made the battlefield on which these great countries met to decide their quarrels. Notwithstanding this disadvantage, the house of Savoy, at the Peace of the Pyrenees in 1659, by which the wars of the French and Spanish monarchies were terminated, after they had raged for nearly 80 years, found itself under Charles Emmanuel II. as great and prosperous as ever. He was succeeded in 1675 by Victor Amadeus II., during whose reign war between France and Germany again broke out. Amadeus became almost necessarily involved, but played his part so ably, that at the Peace of Utrecht in 1713 he not only added considerably to his continental possessions but obtained possession and was formally crowned king of Sicily. By a subsequent arrangement he exchanged Sicily for the Island of Sardinia, from which he and his successors took the title of king. On his death in 1730 he was succeeded by Emmanuel III., who became involved in the war of the Spanish Succession, and saw his territories laid waste by contending armies. The Peace of Aix-la-Chapelle compensated him by the addition of several important districts, and his own enlightened administration added greatly to the internal resources of his kingdom. He was succeeded in 1773 by his son Victor Amadeus III., who reigned till the French Revolution broke out; and was succeeded in 1796 by his son Emmanuel IV., who, after seeing his continental dominions overrun by the armies of the French, took refuge in the Island of Sardinia in 1799, and three years after abdicated in favor of his brother Victor Emmanuel, who remained in Sardinia till 1814, when he again fixed the seat of government at Turin. Shortly after the Congress of Vienna

added Genoa to his territories. An insurrection led to his abdication in 1821 in favor of his brother, Charles Felix, whose reign of 10 years was marked by some important internal improvements. Having left no male issue, a collateral branch succeeded in the person of Charles Albert, who promulgated the liberal constitution of 1848, the provisions of which are referred to above. The same year saw him at the head of a league intended to expel the Austrians from Italy. The disastrous results led to his abdication in March 1849, in favor of his son Victor Emmanuel II., and very probably to his death in the following July. Under the government of Victor Emmanuel the cause of progress and liberal institutions steadily advanced, some of the more important of the reforming measures being the establishment of universal toleration in religious matters, the suppression, with a few exceptions, of the monastic houses, and an unfettered freedom accorded to the press in the discussion of political matters. Such a development of liberal principles naturally proved extremely distasteful to Austria, whose arbitrary sway, exercised over the adjoining kingdoms of Lombardy and Venice, presented so marked and glaring a contrast. Frequent aggressive attempts were made by her, and pretenses sought for provoking hostilities with Sardinia; but the flame only burst out finally in 1859, when, in the month of April of that year, the Sardinian territories were invaded by an Austrian army. The war which then ensued ultimately issued in the establishment of the present kingdom of Italy, into which the Sardinian states have all been incorporated, with the exception of the duchy of Savoy and county of Nice, which King Victor Emmanuel was obliged, as before mentioned, to cede to France. See ITALY.

Sardis, sār'dīs, Asia Minor, the capital of ancient Lydia, stood at the foot of Mount Tmolus (5,906 feet high), $2\frac{1}{2}$ miles south of Hermus. It was traversed by the Pactolus, which flowed through its market-place. To-day, nothing remains at its site (Sart) but a village and some ancient mounds. It was once a wealthy mart, the luxurious capital of the proverbially rich Cræsus, and carried on an enormous trade between the highlands and the coast. Its principal manufactures were woolen goods and carpets. Its strong citadel was destroyed by the Cimmerian Gauls in the 7th century B.C., by the Athenians in the 6th; by Antiochus the Great, 215 B.C., and by Timur in 1402. An earthquake overturned it in the reign of Tiberius. Xerxes and Cyrus the Great resided here before entering upon their great expeditions. The ancient cemetery is of vast extent, and there are interesting remains of the tomb of Alyattes and of the temple of Cybele.

Sar'donyx, a variety of the mineral quartz, in which layers of sard (q.v.), each of even thickness, alternate with layers of white chalcedony. It was highly prized by the ancients for cameos, intaglios, seal rings and engraved gems.

Sardou, sār-doo, **Victorien**, French dramatist: b. Paris 7 Sept. 1831; d. there 8 Nov. 1908. He was for a time a tutor of philosophy, mathematics, and history, but soon began his literary career by writing for reviews and encyclopædias.

His first play, 'La Taverne des Etudiants' (1854) failed at the Odéon in 1854, and for a time he abandoned the theatre. But ere long he was dramatizing again, and he won a popular success in almost every field of the drama save tragedy. In the long list of titles are: 'Les Pattes de Mouche' (1869); 'Les Prés Saint-Gervais' (1862); 'Nos Intimes' (1862); 'Les Vieux Garçons' (1865); 'Séraphine' (1868); 'Patrie' (1869); 'Le Roi Carotte' (1872), an *opéra bouffe*, set by Offenbach; 'Rabagas' (1872); 'L'Oncle Sam' (1873); 'Ferreol' (1875); 'Dora' (1877); 'Les Bourgeois de Pont-d'Arcy' (1878); 'Daniel Rochat' (1880); 'Divorçons' (1880); 'Odette' (1881); 'Fédora' (1882); 'Théodora' (1884); 'La Tosca' (1887); 'Cléopâtre' (1889); the series on the French Revolution, 'Les Merveilleuses', 'Thermidor' (1891), and 'Robespierre', the last written for Sir Henry Irving; 'Madame Sans-Gêne' (1893); 'Gismonda' (1894); 'Marcelle' (1896); 'Spiritisme' (1897); and 'Paméla, Marchande de Frivolités' (1898). Several of these from 'Fédora' onward, were specially written for Sarah Bernhardt (q. v.). In his comedy, Sardou revealed rapid movement, witty dialogue, frequently clever satire on contemporary matters, unconvincing character portraiture, loose construction and improbable episodes. His "historical" dramas aimed at the heroic, but were simply grandiose, their connection with authentic history being generally tenuous, their interest largely one of empty mechanical display. The last specimen, 'Dante,' presented in the United States by Irving in 1903-4, suffered from a lack of coherence. Sardou's dramaturgic skill was great, but his works had no literary value. Consult: Montegut in the 'Revue des Deux Mondes' (1877); Matthews, 'French Dramatists' (1888); Sarrazin, 'Das moderne Drama der Franzosen' (1888); Doumic, 'Ecrivains d'aujourd'hui' (1895).

Sargassum, the most highly organized genus of the marine algæ, *Fucaceæ*, or rock weeds. They are seaweeds which are either attached to stones by a discoid hold-fast or are floating, with long filiform stems, much branched, and bearing long, narrow, leaf-like fronds with distinct midribs. The air-bladders are little, stalked globes, with slender projecting tips, and stand out from the axils of the fronds, like solitary grapes. It is to this characteristic that the generic name remotely refers, and which has given rise to the common names, tropical grapes and grape-weed. Sargasso stems are much employed in South America under the name of goitre-sticks, for the cure of goitre. *Sargassum bacciferum* is the famous gulf-weed, which forms rafts or islands floating together on vast areas of the various oceans, and called "sargasso seas." The one lying in the North Atlantic Ocean, between the Azores and the Antilles, its exact position being determined by the central whirl of the Gulf Stream, is so dense as to be often a hindrance to navigation. It covers a territory nearly equal to the European continent, and was discovered by Columbus on his first voyage, he and the succeeding Spanish navigators calling it the Mar de Sargazo; it is connected by a narrow belt with a smaller sea between the Bermudas and the Bahamas. There is still an-

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other sea in the Pacific, and one in the Antarctic Ocean. It is a disputed question whether the weeds have been torn from the shore and blown to their final resting place, or whether they live and propagate themselves on the high seas. At any rate these floating islands furnish a permanent home to many small pelagic animals, and of predaceous animals seeking them as food.

Sargent, sār'jēnt, Aaron Augustus, American diplomat: b. Newburyport, Mass., 28 Sept. 1827; d. San Francisco, Cal., 14 Aug. 1887. He was a journalist at Washington in 1847, removed to California and engaged in mining in 1849, and subsequently established the 'Nevada Journal.' While editing this paper he studied law, was admitted to the bar in 1854, and elected district attorney of Nevada in 1856. In 1860-72 was a member of Congress, sat in the United States Senate from 1872-9 and in 1882 was appointed minister to Germany. He resigned in 1884 owing to controversies arising from the action of the German authorities in excluding American pork, and later declined the mission to Russia offered him by President Arthur.

Sargent, Charles Sprague, American arboriculturist: b. Boston, Mass., 24 April 1841. He was graduated from Harvard in 1862 and served in the Civil War in 1862-5, gaining rank as brevet major. In 1873 he was appointed director of the Arnold Arboretum at Harvard and since 1879 has been professor of arboriculture there. He edited 'Garden and Forest' (1887-97), and has published: 'Catalogue of the Forest Trees of North America' (1880); 'Report on the Forests of North America' (1884); 'The Forest Flora of Japan' (1894); 'Silva of North America' (1891-1902); 'Manual of the Trees of North America' (1905).

Sargent, Dudley Allen, American physical instructor: b. Belfast, Maine, 28 Sept. 1849. He was graduated at Bowdoin College in 1875, and has been for many years physical director at Hemenway gymnasium, Harvard University, and at the Normal School of Physical Training, Cambridge, Mass. He is the inventor of a modern system of gymnasium apparatus and has published 'Universal Test for Strength, Speed and Endurance' (1902). He is president of the American Association for the Promotion of Physical Education.

Sargent, Epes, American poet and dramatist: b. Gloucester, Mass., 27 Sept. 1813; d. Boston, Mass., 31 Dec. 1880. He was educated at Harvard, was for a time connected with newspapers in Boston and New York, and in 1836 began writing for the stage. His plays include the 'Bride of Genoa'; 'Change makes Change'; 'Velasco'; and 'The Priestess.' He published: 'Songs of the Sea' (1847); 'Poems' (1858); 'The Woman who Dared' (1869); his most noted lyric being 'A Life on the Ocean Wave.' His novels include: 'Wealth and Worth' (1840); 'What's to be Done' (1841); 'Fleetwood' (1845); 'Peculiar: A Tale of the Great Transition' (1863). Still other works are 'Life of Henry Clay' (1843); 'American Adventure by Land and Sea' (1847); 'The Critic Criticised' (1856); 'Arctic Adventures by Sea and Land' (1857); 'Original Dialogues' (1861); 'Cyclopædia of English and American Poetry' (1883).

Sargent, Henry, American artist and soldier: b. Gloucester, Mass., 25 Nov. 1770; d. Boston, Mass., 21 Feb. 1845. He studied art in England in 1793-7. In 1799 he entered the United States army, was aide-de-camp to the governor of Massachusetts with rank as colonel in the War of 1812, and later adjutant-general. He served two terms in the legislature and afterward resumed his profession. His first painting, 'The Landing of the Pilgrims,' was ruined by being rolled on a pole of fresh pine, but the work of the same name at Pilgrim Hall, Plymouth, Mass., is said to be a reproduction of the destroyed work. His other paintings include: 'Christ Entering into Jerusalem'; 'The Starved Apothecary'; 'The Tailor's News'; 'The Dinner Party'; a full length portrait of Peter Faneuil at Faneuil Hall, Boston; etc.

Sargent, Herbert Howland, American soldier and military historian: b. Carlinville, Ill., 29 Sept. 1858. He was graduated from West Point in 1883 and assigned to frontier duty. He was professor of military science at the University of Illinois in 1886-7, and at the outbreak of the Spanish-American war was on duty at Washington, organizing volunteer troops, but was shortly afterward ordered to Santiago, Cuba. In 1899 he was sent to Guantanamo and returning to the United States in that year, was subsequently appointed lieutenant-colonel and assigned to duty in the Philippines. He was engaged in subduing the insurgents in the Island of Luzon, took part in the battle of San Mateo, returned to the United States in 1902, and received rank as captain. He has written: 'Napoleon Bonaparte's First Campaign' (1893); 'The Campaign of Marengo' (1897); etc.

Sargent, James, American inventor: b. Chester, Vt., 5 Dec. 1824. He was partner in the Yale and Greenleaf Lock Company in 1857-65, and in the latter year invented a burglar-proof lock. He invented the Sargent time lock in 1873, the automatic semaphore railroad signals, the glass enameled steel tanks and vacuum pumps used by the Pfaudler Vacuum Fermentation Company, and an automatic smoke consumer, in addition to numerous improvements in locks.

Sargent, John Singer, American painter: b. of American parents, Florence, Italy, 1856. He was educated in Italy, France, and Germany, and received his early art training under Carolus Duran. He was elected member of the Royal Academy of England in 1891 and of the National Academy of Design, New York, in 1897. He has lived abroad all his life and has never spent more than a year in the country of his parents. Having had the advantage of being chosen by Carolus Duran as an assistant in the execution of important government commissions, he thoroughly mastered the secrets of French technique before adopting a method and style which are purely his own. His chief works are in portrait and genre. Among his portraits may be mentioned that of 'Carolus Duran'; 'General Leonard Wood'; 'Mr. Joseph Jefferson'; 'Major Francis Lee Higginson'; 'Homer Saint Gaudens'; 'President Roosevelt'; 'Henry G. Marquand'; 'William M. Chase'; 'Carmen-

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cita); 'Ada Rehan.' His genres include: 'Fishing for Oysters at Cancale'; 'Neapolitan Children Bathing'; 'El Jaleo.' His most ambitious and original works, however, are the decorations in the Boston Library, which include the now famous 'Frieze of the Prophets.' As a painter his manner is French in brilliant versatility and epigram, but his treatment infinitely superior to the millinery effects of Duran and his school. His portraits reflect clearly the characteristics of his sitter and his intuition is so unerring in detecting the subtlest traits of individuality, that it has been said of one of his great portraits, "It is more like Chase than Chase himself." As a specimen of his wall-painting we may cite that portion of the Boston Library decorations known as the 'Dogma of the Redemption.' It is divided into an upper and a lower panel which would seem to represent Heaven and Earth severally. In the upper panel are the three persons of the Trinity enthroned, with hands raised in blessing, the Father wearing the triple crown, or tiara; each enrobed in a flowing, cope-like garment. In the centre of this picture is set up the cross on which Christ is suffering, while Adam and Eve catch in chalices of gold the blood that drips from his hands. Below the foot of the cross is the pelican, symbol of self-sacrificing love. Above the arms of the cross runs the inscription *Remissa sunt peccata mundi* ("The sins of the world have been remitted"). Across the molding which separates the two divisions of the subject is a monkish distich

Factus homo factor hominis, factique redemptor,
Redimo, corporeus corpora, corda deus.
(I, man's maker, now made man, and redeemer of him
I made,
God in flesh, redeem all human hearts and bodies.)

In the lower panel are angels bearing the instruments of the passion, namely, the reed, the nails, the spear, the pillar of scourging, and the scourge, the crown of thorns, and the ladder. The work has all the pomp and dignity of Byzantine conventionalism, and for richness of color, and splendor of arrangement is one of the most impressive of this magnificent series. It is deeply devotional in tone and must be looked upon as among the finest Christian painting of the period.

Sargon, sār'gōn, a king of Assyria, successor of Shalmaneser, reigned from 722 to 705 B.C. See ASSYRIA.

Sark, sār'k, the "Pearl of the Channel Islands" (q.v.), situated seven miles east of Guernsey and 13 miles northwest of Jersey, is about $3\frac{1}{2}$ miles in length and $1\frac{1}{4}$ in extreme breadth. It is surrounded by inaccessible rocks, the chief landing-place Creux (hole) Harbor being on the east coast, where a cave has been enlarged and tunneled through the cliff to give access to the interior. The island consists of two portions, Great Sark and Little Sark, connected by a high and rocky isthmus, called the Coupée, narrowing to the width of only a few feet. On the west is the small islet of Brecqhou. Sark is annually visited by several thousand tourists owing to its interesting and picturesque scenery and numerous romantic caves. The inhabitants are chiefly engaged in fishing and agriculture. Sark is administered as a dependency of Guernsey.

Sarmatia, sār-mā'shī-ā, a name given by the Romans to the country between the Vistula and the Caspian Sea, and corresponding largely to central and southern Russia. The inhabitants were known to the Greeks as Sauromatæ, and to the Romans as Sarmatæ. See SARMATIAN.

Sarmat'ian, the name of a people inhabiting the region known as Sarmatia, who were persistent enemies of the Romans. The Sarmatians were of Aryan origin, excellent horsemen and fierce fighters. The modern Russians are probably descended in part from Sarmatians who remained in their native land, and did not fall victims therefore to Roman or Goth.

Sarmiento, Domingo Faustino, Argentine statesman: b. San Juan, Argentina, 15 Feb. 1811; d. Asunción, Paraguay, 11 Sept. 1888. In 1829 he fought in the insurrection against Rosas and was obliged to flee to Chile, but returned in 1836. He was again obliged to leave the country, and going a second time to Chile he established a normal school at Copiapo. He traveled in the United States and Europe 1845-7 studying modern educational systems. Returning to Argentina in 1851 he helped overthrow Rosas and in 1856 organized a department of public education of which he was the head. He was minister to the United States 1861-8, and president of Argentina 1868-74, giving the country one of the most successful and progressive administrations it ever had. Sarmiento established schools and colleges throughout Argentina and founded a national observatory. He was the author of 'Popular Education' (1848); 'Vida de Abrahán Lincoln' (1866); 'Life of Quiroga'; 'Civilización y barbarie'; 'Las escuelas, base de la prosperidad en los Estados Unidos' (1868). See ARGENTINA.

Sarmiento Gamboa, sār-mē-ēn'tō gām-bō'ā, **Pedro de**, Spanish mariner: b. Galicia, Spain, about 1530; d. there about 1590. He was in command of the naval station in the Pacific in 1578 and in 1579 was ordered by the viceroy to take possession of the Straits of Magellan for the purpose of intercepting Drake, then engaged his depredations off the coasts of Peru and Mexico. Drake evaded him, returning by way of the Cape of Good Hope, and after waiting for several months he explored the coast and returned to Spain in 1580. In 1581 he was sent by Philip II., with a fleet of 24 vessels to fortify the Straits, holding joint command of the expedition with Diego Flores. The latter became jealous of Sarmiento and deserted him, taking 12 vessels which left Sarmiento with but four, eight having been previously destroyed in a storm. In 1583 he founded San Felipe (Port Famine), garrisoned it with 300 men and in 1584 sailed for Europe, but was captured by the English and imprisoned until 1588. His colony lost all but two of its members by starvation, one being rescued by Cavendish in 1587 and another by Meriche in 1589. After his liberation he endeavored to secure redress for his treatment by Flores, but his complaint was neglected and he died in poverty.

Sarnia, sār'nī-ā, Canada, town, port of entry, and county-seat of Lambton County, Ontario; on the River St. Clair, near Lake Huron, and on the Grand Trunk and Lake Erie & Detroit River railways; opposite Port Huron, Mich.

with which it is connected by ferry, and by the famous Saint Clair tunnel, $2\frac{1}{4}$ miles long, built and operated by the Grand Trunk Railway. Sarnia has a good trade in grain and live-stock, and oil and salt refineries, tanneries, breweries, foundries and machine shops, flour and saw mills, and manufactories of carriages, agricultural implements, woolens, wooden-ware, etc. It is lighted by gas and electricity, and has a good water system.

Saron'ic Gulf (SINUS SARONICUS), Greece, the ancient name of the Gulf of Ægina. See ÆGINA.

Saros, sār'ōs, in astronomy, an ancient Assyrian period, the origin and exact length of which are unknown, though they have been the subject of much disputation. By some authors the saros has been confounded with the Metonic cycle.

Sarpedon, sār-pē'dōn, one of the heroes of the Iliad, slain by Patroclus at the siege of Troy. His grandfather of the same name is represented in Grecian mythology as the son of Zeus and Europa, who founded a kingdom in Lycia.

Sarpi, sār'pē, **Paolo**, Italian historian: b. Venice 14 Aug. 1552; d. 14 Jan. 1622. He entered young into the religious order of the Servites, and was appointed chaplain to the grand duke of Mantua, and lecturer on the canon law. After two years he returned to Venice, and became provincial of his order (1578). He was afterward made Procurator-general of the Servites (1585). His leanings toward Protestantism and his intercourse with Protestant leaders brought on him the imputation of favoring heresy, if not of being a heretic. In a dispute between the Pope and the Venetian government on the subject of ecclesiastical matters Father Paul showed himself a strenuous advocate of Venice, and was summoned to Rome, to answer for his conduct; but the affair was compromised. His political enemies attempted to assassinate him in 1607, on which occasion he received many dangerous wounds. Father Paul employed the latter part of his life in writing the history of the Council of Trent, a work which has proved of little historical value and is now accounted to be untrustworthy on account of its extreme and evident partisanship. His labors extended to diverse branches of knowledge; he was skilled in the canon law, and was also distinguished for his acquaintance with anatomy. He appears to have discovered the valves of the veins which facilitate the circulation of the blood. His 'Istoria del Concilio Tridentino' was first published in London in 1619, having been transmitted to this country through the medium of the British resident at Venice, Sir Henry Wotton, a personal friend of the author. This work is strongly anti-papal, nay, even rationalistic in tone, and was answered by a voluminous work on the same subject by the Jesuit Pallavicino. The works of Father Paul were printed at Verona 1761 (8 vols. 4to), and at Naples, 1790 (24 vols. 8vo). His life has been written in Italian by Bianchi-Giovini (1836); and in English by A. Robertson (1894). Consult also 'Atlantic

Monthly' (Jan. and Feb. 1904); T. A. Trollope, 'Paul the Pope and Paul the Friar' (1860).

Sarracenia, sār-a-sē'nī-ā, a genus of carnivorous plants, of about eight species growing in bogs in eastern North America, and named in honor of Dr. J. A. Sarracin. They have peculiar large nodding flowers solitary on their scapes. The 5 sepals are bracted at the base, and the 5 fiddle-shaped petals are purple, brown or yellow, and hang about a style which is dilated at the apex until it resembles an inverted umbrella, with five rays, terminating in hooked stigmas under the angles. The anthers are grouped about the base of the styles. The 3 to 5 celled ovary becomes a colored capsule in fruit. Just why these flowers should have given the name "side-saddle flower" to the plant no one seems to know, although they do resemble a pillion. The origin of the other vernacular names—pitcher plant, trumpet leaf, or huntsman's horn, is very evident, for the leaves are hollow and with a lid more or less erect.

These leaves are dispersed in rosettes and are very curiously adapted, in the several species, for entrapping and digesting insects. The most common species is *Sarracenia purpurea*, which has tubular leaves, inflated at the middle and contracted at the orifice, where a heart-shaped wing, curved somewhat like a scoop, joins the hollow leaf. Another ribbon-like wing, starting from the base of the leaf, extends along the concave surface of the tube to the orifice. The whole pitcher-like leaf is green, veined with reddish purple. The scoop-like wing at the summit of the leaf catches rain-water and deflects it into the pitcher, which is often half-filled. The inside of the scoop is lined with glandular hairs which secrete honey, and the whole inner surface of the pitcher is lined with stiff spinous bristles, slippery and pointing downward, and the nearer the base the longer the points become. The reason for this apparatus appears when insects are attracted to the *Sarracenia* by the honey secreted in the hood-like wing. Some fly to it, some crawl up from the ground, helping themselves to climb by the longitudinal wing. Once there they feed on the honey, but if they carelessly stray from the wing to the orifice, where the slippery bristles begin, they promptly fall into the water collected in the pitcher. In spite of their struggles they can never crawl up past the relentless chevaux-de-frise of glassy, down-pointed teeth, and ultimately drown in the liquid. So many sometimes meet this tragic death that the putrid odor arising from the pitcher is offensive. Just what happens to the decaying bodies does not seem to be certain. Other carnivorous plants digest their victims with acid secretions and pepsin, and insects seem to be macerated in the *Sarracenia purpurea* pitchers more quickly than by ordinary rain-water, yet it is believed that the plants profit mainly by the liquid manure obtained. Consult Darwin, 'Insectivorous Plants' (London 1875).

Sar'saparil'la, an alterative drug obtained from the roots of the genus *Smilax*, indigenous to Central and South America. The drug yielding species of this genus of the *Liliiflora*, to which the American cat-briers belong, are not very exactly identified, although sarsaparilla has been known to Europeans since 1536-45, and was extensively used soon afterward. *Smilax* of-

ficinalis, *S. medica*, and *S. papyracea*, are believed to be the principal sources of supply of sarsaparilla. They are tough twining shrubs with square or round prickly stems, small flowers and generally shining leaves. Sarsaparilla plants were somewhat cultivated in Jamaica, but are chiefly obtained by trade with the aborigines of the countries where they grow. The drug itself is extracted from the horizontally creeping roots of the *Smilax*, which radiate from the stems, and are so long that it takes an Indian many hours to disentangle them from the soil and other roots. They are then dried and wrapped up for transportation. The form of the original package in which the roots reach the pharmacist, is an indication of the market from which it is sent, and the country from which it is exported furnishes the commercial name of the drug. Thus, Rio Negro, otherwise known as Para or Lisbon sarsaparilla, is always exported in cylindrical bundles, about $3\frac{1}{2}$ feet long and 5 or 6 inches in diameter, composed of finely wrinkled roots, brown with adhering earth, cut square and even at both ends, and wound closely with the stems of *Pothos*. Jamaica sarsaparilla (a name which formerly included many other varieties, now differentiated) is sent out loosely. Sarsaparillas are classed as mealy or non-mealy sarsaparillas, according to the amount of starch granules in the parenchyma, a condition which seems to depend upon locality, and they differ in the color of their barks, and in microscopical characters.

Several plants are used as substitutes for true sarsaparilla. The aromatic roots of *Aralia nudicaulis* and *A. hispida*, furnish respectively the wild and bristly sarsaparilla, in America (see *ARALIA*). Texas sarsaparilla comes from the roots of *Menispermum canadense*. Australia has its spurious sarsaparilla in the spindle-shaped root of *Hardenbergia*. Indian sarsaparilla is derived from *Hemidesmus indicus*; German sarsaparilla is the roots of various species of *Carex*, while the Italian drug of that name is the root of *Smilax aspera*.

Sarsfield, Patrick, EARL OF LUCAN, Irish Jacobite: b. Ireland about 1645; d. Netherlands August 1693. He became a colonel in the Irish army in 1686 and was a strong supporter of the cause of James II. in Ireland, by whom he was created Earl of Lucan. He drove the English out of Sligo, fought at every important engagement of the war, and had charge of the defense of Limerick. When that city capitulated in 1691, he crossed over to France where James gave him command of the Irish troops in the intended invasion of England the following year. After the battle of La Hogue, 19 May 1691, he tendered his services to France, fought at Steenkirk on 3 Aug. 1692, and was mortally wounded at Neerwinden in the battle of Landen 19 August.

Sarsi (sār'sē) **Indians**. Also Sarcee, Sarsee, Sussee, etc., from a Blackfoot word said to signify "not good." Their own name is Sotemia. A tribe of the Montagnais division of the Athapaskan stock of North American Indians who formerly subsisted mainly by hunting, fur-trading, but who now gain a livelihood by farming, stock-raising, and haying and as laborers. They are under the Sarcee agency at Calgary, N. W. T., Canada, where they numbered 203 in 1902.

Sartain, sār'tān', Emily, American artist: b. Philadelphia 17 March 1841. She is the daughter of John Sartain (q.v.), under whom she studied and worked at engraving, afterward studying (1864-70) at the Pennsylvania Academy of Fine Arts, then in Italy, and still later (1871-5), under Luminais, in Paris. She excels in mezzotint engraving, in etching, and in portrait-painting; has accomplished much in book-illustration and the etching of framing prints; and in genre work has also distinguished herself. She received a medal at the Centennial Exhibition in 1876, and the Mary Smith prize at the Pennsylvania Academy in 1881 and 1883. In 1875 and 1883 she exhibited oil paintings at the Paris Salon. From 1881 to 1883 she was an editor of 'Our Continent.' In 1900 she went to Paris as official delegate from the United States government to the International Congress on Instruction in Drawing.

Sartain, John, English-American engraver and editor: b. London 24 Oct. 1808; d. Philadelphia 25 Oct. 1897. Before reaching his majority he did notable work, having studied line engraving under John Swain; and his illustrations for Otley's books on early Italian prints (1826) gave promise of his future achievements. He came to the United States in 1830, settled in Philadelphia, and introduced in this country mezzotint, which he had begun two years earlier to practise. Entering actively into his work here, he added to engraving miniature-painting on vellum and ivory, and portrait-painting in oil. He was the designer of several public monuments, of which the best known is that to Washington and Lafayette in Philadelphia. He was also editor of the 'Foreign Semi-monthly Magazine,' and of the 'Union Magazine,' which he renamed 'Sartain's Union Magazine.' Among his more important engravings are 'Christ Rejected' (1862), after Benjamin West; 'The Ironworker and King Solomon' (1876), after Christian Schuessele; and the 'Battle of Gettysburg,' after Rothermel. He engraved many other historical paintings, and also portraits of famous Americans, after well-known artists. By his long and varied career of productive work, his services as chief administrator of fine arts at the Centennial Exhibition in 1876, and through the many positions which he held in connection with prominent societies and institutions, he accomplished results of great importance in the development of art, particularly the art of his adopted country. He wrote 'Reminiscences of a Very Old Man' (1899).

Sartain, William, American landscape and genre painter: b. Philadelphia 21 Nov. 1843. He is the son of John Sartain (q.v.), and until 1867 worked under his father; then for two years under Schuessele and at the Pennsylvania Academy of Fine Arts. He next went to Paris, where he continued his studies under Yvon and Bonnat and at the Ecole des Beaux-Arts. In 1875, having sketched in many countries, he exhibited at the Royal Academy, London. Returning to the United States in 1876, he exhibited at the National Academy, of which, four years later, he became an associate. He is one of the original members of the Society of American Artists, and is professor of the Life Class of the Art Students' League, New York. His oil-paintings include an 'Italian Head' (1876); 'Narcissus'

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(1878); and 'Lucia, near Algiers.' Among his works in water-color are an 'Arab Café' (1880); 'View of the Ghetto, Venice'; 'End of the Day'; and 'In the Hackensack Valley.'

Sarti, Giuseppe, joo-sép'pě sār'tě, Italian composer: b. Faenza 1 Dec. 1729; d. Berlin 28 July 1802. He studied under Padre Martini at Bologna. In 1751 his first opera, 'Pompea in Armenia,' was put upon the stage at Faenza and was well received. Other operas soon followed, and the young composer was invited in 1753 to Copenhagen, where he was appointed court chapel-master. Returning to Italy in 1775 he was nominated director of the Conservatory dell' Oppedaletto, and in 1779 chapel-master of the Milan Cathedral. In 1784 he was invited by the Empress Catharine to Saint Petersburg, and appointed her chapel-master. At the command of the empress he founded a musical conservatory at Ekaterinoslav, and for his services was raised to the highest rank of nobility. He wrote about 30 operas in all. A sacred terzetto, 'Amplius Lava Me,' is still performed. Sarti was the musical instructor of Cherubini.

Sarto, Andrea Del, än-drä'a dël sār'tō, Italian painter: b. Florence 17 July 1486; d. there 22 Jan. 1531. His real name was Andrea Angeli, the name del Sarto (of the Tailor) having been applied to him from the occupation of his father, Angelo di Francesco. His teachers were Piero di Cosimo and Franciabigio, but he cultivated his talents principally by the study of great masters, such as Leonardo da Vinci, Fra Bartolommeo and Michelangelo. He painted many pieces for his native city. Francis I. induced him by a considerable salary to go to France in 1518. He soon returned, with a commission from the king to purchase ancient and modern works of art. Among other works he painted about this time the 'Sacrifice of Abraham,' which has since been placed in the gallery of Dresden, a replica being in the Prado at Madrid; 'A Burial, in the Pitti Palace,' and 'The Dead Saviour with Mary and the Saints,' in the gallery of the grand duke; also a beautiful 'Madonna,' in the church of l'Annunziata, called 'Madonna del Sacco,' and several others in Florence; a 'Charity,' now in Basel; 'Tobias with the Angel,' and several 'Holy Families'; the 'History of Joseph,' in two paintings, in the Paris Museum. His coloring both in fresco and oil is full of sweetness and force; his draperies are easy and graceful. The nude, in his compositions, is excellently designed, but his figures want that force and vivacity which animate the works of other great painters, though they possess correctness, truth, and simplicity.

Sarto, Giuseppe. See PRUS X.

Sartor Resartus, sār'tōr rē-sār'tūs, a noted satirical work by Thomas Carlyle, which first appeared in 'Fraser's Magazine' in 1833-4, and in book form in 1835. It is divided into three parts,—introductory, biographical, and philosophical.

Sarto'ris, Adelaide Kemble, English opera singer, daughter of Charles Kemble (q.v.): b. London 1814; d. 4 Aug. 1879. Her operatic success began in 1839 at Venice where she appeared

as Norma. She subsequently sang in many cities, but in 1843 left the stage and was married to F. U. Sartoris. Their son (A. C. Sartoris) married the daughter of President Grant in 1874. Mrs. Sartoris published 'A Week in a French Country House' (1867); a delightful French volume, issued in 1903; 'Medusa, and Other Tales' (1868); 'Past Hours' (1880).

Sarto'rius, the *sartor*, a muscle of the Latin *sartor*, a patcher, at one end to the edge of the thigh which is attached to the spinous process of the of the anterior, superior, ^{5th} the pelvis, and at the ilium or chief bone of the ^{thigh} and internal part other to the superior, anterior, ^{leg} from the fact of the tibia. It takes its name ^{from} two sartorius that it is by the contraction of the ^{muscles} in the manner of tailors. See ANATOMY.

Sarts, a name given to the settled inhabitants, whether agriculturists or traders, as distinguished from the nomad inhabitants of Turkistan, Afghanistan, Persia, and the adjacent regions of Asia. Strictly speaking the name has no ethnological significance.

Sarum, sār'rūm, Old, England, an ancient deserted city of Wiltshire, two miles north of Salisbury, or New Sarum, to which the inhabitants of Old Sarum removed after 1219 owing to an insufficient water supply. Notwithstanding its desertion, the old site retained its electoral rights to return two members to Parliament, until its disenfranchisement by the Reform Bill of 1832. It has passed into English literature as a type of the "rotten borough," acquired by purchase; its most distinguished representative was William Pitt, whose first appearance in Parliament was as member for Old Sarum.

Sarum Use, the revised liturgy prescribed for his diocese by Osmund, bishop of Sarum (the old name of Salisbury), 1078-99; and generally adopted throughout the province of Canterbury. The other English uses mentioned in Act of Uniformity were those of Lincoln, York, and Bangor.

Sas'in, an East Indian antelope.

Saskatchewan, sās-kach'ē-wan, a Province of Canada named after the River (q.v.). Prior to 1905 it was a portion of the North West Territories with an area of 107,092 square miles and with a small and scattered population. On 1 Sept. 1905 it was created a Province with full rights of self-government and including the Territory of Assiniboia with a portion of Athabasca. The area became 250,650 square miles of which 8,318 square miles was water surface—chiefly small lakes; and the population, which had been 11,150 in 1891 and 25,679 in 1901, became 91,279.

Physical Features and Climate.—The Province is traversed by the North and South Saskatchewan Rivers. In the farthest north is the Churchill River, the Qu'Appelle and the Souris Rivers are in the centre and south. There are some large lakes, among which may be mentioned the Athabasca 2,842 square miles, the Reindeer 2,437 square miles, Wollaston 906

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square miles, the Quill Lakes 163 square miles, the Last Mountain 98 square miles. The best evidence as to climate is the production of the Province—its grain, vegetables and live stock compete with the best in the world. The atmosphere is clear and bright—a large proportion of sunshine, with a never-failing breeze to temper the heat of the summer days. The winters are cold but bright and dry. It is very similar in a general way to that of Alberta and Manitoba. The average annual mean temperature in ten years (1901-11) was 34.6.

Progress of the Province.—The railway mileage increased from 900 in 1896 and 1,520 in 1905, to 3,800 at the end of 1910 with 3,121 miles in operation. While the long-distance telephone mileage was nil in 1900, it was 1,500 in the end of 1908 and 7,350 in 1910. The townships partially settled and under a form of local or municipal government were 882 in 1905, and 2,348 on 1 May 1911. The Loan Company investments which in 1906 totalled \$12,000,000 were in 1910 \$40,000,000. By the end of 1911 \$1,000,000 had been spent on University Buildings and \$2,000,000 on Parliament Buildings.

Agriculture.—The yield of wheat in 1905 was 26,107,286 bushels and the acreage 1,130,084; in 1911 the yield was 96,796,588 bushels and the acreage 5,232,248. The yield of oats in 1905 was 19,213,055 bushels and the acreage 449,936; in 1911 the yield was 98,676,270 bushels and the acreage 2,192,806. The production of barley grew in these years from 893,396 bushels to 6,859,894 and that of flax from 398,399 bushels to 10,377,701. In live stock the number of horses increased from 240,566 in 1906 to 574,972 in 1911, milch cows from 112,618 to 231,297, other cattle from 369,236 to 546,205, sheep 121,290 to 125,072, swine from 123,916 to 333,218, poultry from 3,411,052 (1908) to 4,643,858. In dairying the coöperative idea, as between Government and farmers, was put into operation with some success through the organization of Government creameries and, in 1911, the Government backed up the Grain Growers' Association in the establishments of coöperative elevators for storing grain.

Settlement and Population.—Immigration poured into the Province after its separate organization. To-day the whole of the Eastern half of South Saskatchewan is practically homesteaded, while Central Saskatchewan, from Manitoba to the South Saskatchewan River, is thickly dotted with homesteads—excepting the heavily timbered district in the northeast. Large settlements have also been made west and south of Saskatoon, as well as south of Battleford, and farther north, in the Prince Albert District. In all these districts as well as in the southwest triangle of the Province—some 23 million acres—which include the lands south of the main line of the Canadian Pacific Railway, from Moose Jaw west, as well as all the lands which remain unoccupied north of Swift Current and Maple Creek, there are still thousands of homesteads available. In all, there are in the Province, 86,826,240 acres available for settlement. Homesteading invariably proceeds from railway lines and the building of the Grand Trunk Pacific and rapid extension of other lines of railway during the past few years have been a great factor in bringing settlement to Saskatchewan.

In population the Province has increased from 91,000 in 1901 to 492,432 in 1911. Villages are springing up almost daily and the growth of a settlement of one family into a town of 1,000 persons within a year is quite common. Some of the more notable places are Yorkton, Weyburn, Battleford, Estevan, Swift Current, Melville, Indian Head, Rosthern, Moosomin, Wolseley, Maple Creek, Qu'Appelle, Humboldt, Strassburg, Arcola, Watrous, Lumsden, Lloydminster, Melfort and Wilkie. The larger centres are as follows:

	Dominion census, 1901	Dominion census, 1911	Local census, 1912
Regina.....	2,249	30,213	41,000
Moose Jaw.....	1,558	13,823	20,623
Saskatoon.....	113	12,004	18,096
Prince Albert.....	1,785	6,254	10,000

History, Education, etc.—The Provincial Government since 1905 has been led by Walter Scott (Liberal), who has won in that period three elections. His chief assistant has been J. A. Calder and the policy of the Government has been one of local development. Elaborate Parliament Buildings have been constructed at Regina, the University of Saskatchewan built and organized at Saskatoon, hundreds of bridges constructed throughout the Province, the telephone system acquired and managed, grain elevators worked (1912) in coöperation with the farmers, the railway operated mileage increased from 2,025 in 1907 to 3,121 in 1911. Arrangements were made with the Canadian Northern and the Grand Trunk Pacific in 1909 for the construction of branch lines under a total Government guarantee of \$11,999,000. In 1911 there were 1,000 miles of new track under construction. The Province at the close of this year had 323 Bank branches within its limits and clearing-houses showing a total of \$169,777,000; its timber-cut was 75,931,000 feet B. M.; the investments of insurance and loan corporations in the Province totalled \$42,734,000. As to education the enrolled pupils increased from 31,275 in 1905 to 63,964 in 1910; the school districts from 1,190 to 2,255; the total Provincial grants from \$197,649 to \$277,908 and local receipts from \$1,601,309 to \$4,088,583. The University of Saskatchewan in 1911 had 106 students; the Anglicans were at this time building a college at Saskatoon, the Methodists had Regina College well under way in construction and operation, the Presbyterians were constructing a college at Moose Jaw.

Saskatchewan, a river in Canada, which has its sources in the Rocky Mountains near lon. 115° W. It is formed by the junction of two main branches, called respectively the North and South Saskatchewan, which flow generally east to their junction, about 25 miles east of Prince Albert. Thence the river takes a curve north-east and southeast, receives the Carrot River from the south, and passing through Cedar Lake empties into Lake Winnipeg, after a course of about 1,300 miles measuring along the South Branch, some 70 miles less than along the North Branch. It flows through a region yielding coal, salt, iron, gold, etc., and now attracting numer-

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ous settlers. From the South Branch of this great river northwest to Peace River the climate is adapted to the growth of wheat, and the valley of the river is said to be fitted to sustain as dense an agricultural population as any area of equal extent in the world. The main stream and its branches afford about 1,000 miles of navigable waterway, and steamers now ply on it.

Sas'saby, or Bastard Hartbeest. See HARTBEEST.

Sas'sacus, Pequot Indian chief: b. near Groton, Conn., about 1560; d. Mohawk Settlement, N. Y., June 1637. He was a powerful chief, a great warrior, and was believed by his own and other tribes to possess supernatural powers. The Pequot tribe occupied a large tract of land in southeastern Connecticut and consisted of about 700 warriors who were the terror of the settlers along the New England coast. In 1637 he attacked the English fort at Saybrook, Conn., massacred its inhabitants, and then attacked Wethersfield, where he murdered several women and made captives of others. The colonists mustered their forces under the leadership of John Mason (q.v.) and destroyed the Pequot settlement, 5 June 1637. Sassacus took refuge with the Mohawks, who soon afterward murdered him.

Sas'safras, one of the most familiar, although not one of the largest, trees (*Sassafras sassafras*) in the eastern United States. Since it is readily propagated by seeds or by suckers which spring up from interminable slender rootstocks, and is apparently not liked by cattle, it is one of the first trees to re-forest pastures and fields that have the light, moist soil that it affects. It is a veritable pest to one trying to clear land, as the smallest piece of rootstock left in the soil seems to send up a vigorous sprout. Its long roots, however, make it a difficult tree to transplant, unless young. Near the Mississippi, the sassafras attains its greatest height (about 80 feet), and is stout, with horizontal rugged branches, so that the foliage has a stratified appearance, and a flattish top; it decreases in size as its northern limit is reached until it becomes only a tall shrub. The bark on old trees is very thick, and gray, with longitudinal scaly ridges; on the young twigs it is pale green, and easily slips off. The shining, bright-green leaves will range in shape, on one spray, from an oval to a three-lobed outline, the "mitten shape," with one lobe at the side of the leaf, being characteristic. The flowers appear before the leaves in late winter if sheltered, and are generally unisexual, male and female blooms being found on different trees. They dangle in tassel-like racemes and are honey-colored, and honey-scented, and thus attractive to bees. The staminate flowers are apetalous, with a six-lobed calyx, orange-stalked glands and nine stamens; the pistillate flowers have a similar perianth, a pale green ovary and style, and orange rudiments of stamens. The fruits are very brilliant, dark-blue, oblong, thin-fleshed berries, surrounded at their bases as the cup encloses the acorn, with a bright scarlet calyx-tube, borne on a thickened and elongated stalk. Unfortunately they are so soon taken by the birds that they are seldom seen, but the leaves assume tints in autumn which deepen from soft tones of yellow to dark red.

Sassafras is a member of the laurel family, to which camphor also belongs, and the whole plant, from the roots with their scaly, orange-colored bark to the leaves, is aromatic. Thoreau says of it: "The green leaves bruised, have the fragrance of lemons and a thousand spices." There is a legend that sassafras odor was wafted to the nostrils of Columbus on his first voyage, and convinced him that land was near.

The roots of sassafras very early in American history became an important article of medicine, worth three shillings a pound, and they were one of the objects for which an English expedition landed in Massachusetts in 1602. It was also called "ague tree," as a decoction of its bark was supposed to cure that disease. In American household practice, sassafras tea, an infusion of the young shoots and roots, has long been a favorite remedy for colds and a tonic, being a sudorific and stimulant. It is also an ingredient of root-beer. The bark of twigs and the pith are rich in mucilage (as are the leaves), and make a lubricant for oculists, and a yellow powder to thicken Creole gumbos, much as okra is used. The oil of sassafras is used for a perfume for soaps, etc. The wood itself is orange-colored, with pale sap-wood, and when stripped of its bark resists decay for some time, while in contact with soil, so that it can be made into fence posts, although too brittle and coarse-grained for any other purpose.

Australian sassafras is the name given to several large evergreen trees with aromatic barks, growing in Australia and Tasmania, namely: *Atherosperma moschata*, *Doryphora sassafras*, and *Daphnandia micrantha*. Brazilian sassafras, or sassafras nut, is the picurium bean. Swamp sassafras is the *Magnolia glauca*.

HELEN INGERSOLL.

Sassanidae, sās-ān'ī-dē, a dynasty of Persian kings which succeeded the dynasty of Arassidae in 226 A. D. The founder of the line was Ardeshir, known to the Greeks as Artaxerxes; he was the grandson of Sassan, from which fact the dynasty is named. The Persian empire was much extended under this dynasty as the outcome of successful wars against the Roman and Byzantine emperors. The Zoroastrian religion was brought back and maintained. The dynasty lasted until the death of Yezdegerd III., in 1652. This king had been beaten by the caliph Omar in the battle of Nehavend, 10 years before, his territory having fallen into the hands of the Mohammedans. See PERSIA.

Sassari, sās'sā-rē, Italy, in Sardina, (1) capital of the province of its own name, 12 miles southeast of its port, Porte Torres. It is situated on a height 650 feet above the sea, amid orange and olive groves. It is well built, and has several handsome palaces, churches, monasteries, nunneries, colleges, universities, an old citadel, a library, hospital, etc. Tobacco is the staple manufacture; trade is carried on in grain, oil, cheese, and goat-skins. Pop. about 40,000. (2) The province occupying the north part of the island has an area of 4,122 square miles; pop. about 310,000.

Sassoferato, Giovanni Battista Salvi, jō-vān'ē bāt-tēs'tā sāl'vē sās-sō-fā-rā'tō, Italian painter: b. Sassoferato, Ancona, Italy, 11 July 1605; d. Rome 18 April 1685. He learned the elements of his art from his father, and after-

ward went to Rome and Naples and studied under Raphael, Domenichino, Guido, and Albani. His paintings, whose subject is chiefly the 'Madonna and Child,' are filled with deep and true feeling and the coloring especially is elaborated with exquisite care, the principal scheme of his pictures including warm, luminous flesh tints, bright blue scarfs, and crimson robes, harmonized with inimitable skill. He has also executed some good portraits and landscapes; his pictures are still highly esteemed and in 1858 his 'Marriage of Saint Catharine' was sold for £1,076 sterling, about \$5,880.

Sassolite, native boric acid, $B(OH)_3$, occurs in the lagoons of Tuscany and in other natural waters, from which it is derived on a large scale by evaporation. It is also found in small, pearly, white scales, and as an incrustation.

Sassulitch, sās-sool'ch (**Sassoulitch**, **Zassulitch**), Vera, Russian nihilist: b. Russia 1853. She was accused of complicity in a nihilist plot in 1869 and unjustly imprisoned for many years. In 1878, indignant at the treatment inflicted on a prisoner by the Saint Petersburg chief of police, Trepoff, she armed herself with a revolver and on 5 February coolly attempted his assassination. She was tried and acquitted in April 1878. The trial was afterward declared null and void, but she disappeared and has since lived in retirement in Switzerland.

Sasteen (sās'tē-ān) **Indians**. See **SHASTA INDIANS**.

Sátára, sā-tā'rā, or **Sattara**, India, in Bombay, (1) capital of the district of the same name, 56 miles south of Poona, crowns a small, steep, and rocky hill, just below a strong hill fort. It consists of one long street of uniform appearance, excepting the rajah's palace, which is of modern construction. The town was formerly the chief seat of the Mahrattas. Pop. 29,601. (2) The district covers an area of 4,987 square miles. Much of the territory is irrigated, and the chief crops are millet, pulse, oil-seeds, and sugarcane. The manufactures are cotton-cloth, blankets, and brass-ware. The Southern Mahratta Railway traverses the district from north to south. Pop. about 1,200,000.

Sat'ellites, in astronomy, secondary planets or moons. One satellite has been observed with Neptune; four with Uranus; Saturn has eight, Jupiter five, Mars two, and the earth one. The rings of Saturn are composed of a great multitude of small satellites.

Satin, in textile manufacture, a closely-woven silk, with a glossy surface. In the manufacture of other silken stuffs each half of the warp is raised alternately; but in weaving satin the workman only raises the 5th, 8th, or 10th part of the warp; thus the weft is hidden beneath the warp, which, presenting an even, close, and smooth surface, is the more capable of reflecting the rays of light. In this way satin acquires that lustre and brilliancy which distinguish it from most other kinds of silks. The chief seats of this branch of manufacture are Lyons in France, and Genoa and Florence in Italy. From the East Indies are imported those light stuffs called Indian or Chinese satins.

They are either plain, damasked, striped, open-worked, or embroidered. See **SILK**.

Satin-bird, a kind of Australian bower-bird (*Ptilonorhynchus violaceus*). The adult male is conspicuous for the satin texture of its glossy black plumage. The younger bird is at first entirely of a dull green color, which gradually becomes mottled with black, and eventually changes entirely into that hue. Long before the construction of the nest, and quite independently of it, they, with consummate skill, weave an arbor-like gallery of uncertain length (see **BOWER-BIRDS**), in which they amuse themselves with the most active glee, the male displaying himself therein to attract the hen bird. The architecture of the bower is excessively tasteful, and scarcely a day passes without some fresh arrangement of the shells, feathers, bones, and other decorative materials, which they bring from long distances in the bush to ornament the bower and the platform on which it stands.

Satin-flower, or **Satin-pod**, a cruciferous plant of the genus *Lunaria*, native to Europe and Asia. One of the two species (*L. rediviva*) is perennial, the other (*L. annua*) is annual or biennial, and is called "honesty." Both are pubescent, branching herbs, with mostly cordate leaves, and are cultivated not only for their four-merous, large violet flowers in terminal racemes, but for the long-stalked pods, which are more than an inch long, very flat, and two-celled. The veined valves covering the seeds, which are long, stemmed, soon fall off with the seeds and leave only the partition wall between the cells. This is elliptic in shape, of parchment-like texture, and shining with a silvery gleam that makes the groups interesting for decoration, and they are much sold on Paris flower-stands for this purpose.

Satin Spar, a name given to the fibrous variety of either gypsum or calcite. These may be distinguished from each other by the effervescence of the calcite satin spar with acids and also by its superior hardness. The color is usually snowy white, sometimes flesh or salmon red. Owing to the fibrous structure, the mineral shows a beautiful satiny or pearly opalescence. It is rather extensively manufactured into cheap jewelry and ornaments. The best material for this purpose comes from England and is sold at many tourist resorts, notably Niagara Falls, near which place small quantities of inferior material occur native.

Satin-wood, the product, principally of the *Chloroxylon swietenia*, of India and Ceylon. This is a small tree with large panicles of whitish flowers and deciduous, long, pinnate leaves, and can furnish a log 3 to 6 inches square. The wood is very hard, close-grained, and durable, and light orange in color; it takes a fine polish and when of the feathered variety is very beautiful, but liable to split. In the 18th century this ornamental wood was much in demand for handsome furniture, with scroll work, and with medallions painted upon it. It is now principally used for cabinet-work, for picture-frames, the backs of brushes, and general turnery. Several other species of trees in the East and West Indies, especially the *Maba buxifolia* and *Xanthoxylum caribaeum*, produce woods of similar appearance, quality, and name.

Satinet, an inferior fabric, woven much thinner than ordinary satin. The name is also given to a kind of cloth woven, with cotton warp and woolen weft, to imitate satin.

Satire, a kind of literary composition in verse or prose, in which wickedness or folly is censured and held up to reprobation: it is a word of Latin origin, and the ancient Roman poets were the inventors of the satire. From the time of Lucilius (d. 103 B.C.) till now, says Dryden, "the very name of satire is formidable to those persons who would appear to the world what they are not in themselves." Of the four princes of Roman satire—Lucilius, Horace, Persius, Juvenal—Persius (d. prematurely in the reign of Nero) is the least important. Juvenal (who appears to have produced satires in the reign of Domitian and who survived into the time of Hadrian, 117 A.D.) uses satire with consummate power and spirit, as an engine for attacking the brutalities of tyranny, and the crimes, the follies, and the frenzies of a degenerate society: he is confessedly the foremost satirist not only of ancient but of all times: great modern poets of all countries have translated or imitated the 16 satires of Juvenal: and he has been better translated into English than almost any other ancient poet. Horace (Augustan period) developed satire into a branch of composition peculiarly his own, and in this branch he is without a rival: he ridicules the follies of the world from the point of view of a man of the world; and though his morality does not rise above the level of a prudential moderation, he enforces it with so much dramatic liveliness and gay humor that he has ever been the favorite poet of men of letters and epigrammatists. A totally different form of satire is the mediæval 'Reynard the Fox,' the 'Owlglass' (*Eulenspiegel*), 'Piers Plowman'; followed in the Reformation epoch by Ulrich von Hutten's 'Epistolæ Obscurorum Virorum,' Erasmus' 'Praise of Folly,' Rabelais, 'Gargantua,' Buchanan's 'Franciscanus,' etc. In Spain, where no freedom of criticism existed, the spirit of satire took refuge in the picaresque novel, prototype of Lesage's 'Gil Blas'; Cervantes' 'Don Quixote,' too, might be classed as a satire were it not so much more. Most of the great dramatists of the 17th century were more or less satirists: among them Molière stands pre-eminent. Butler's 'Hudibras' is a model of unadulterated satire; and political satire is carried to perfection in Dryden's 'Absalom and Achitophel.' In France, Boileau was regarded as the modern Horace in satire and in the mock-heroic, but in both respects he was equalled or even surpassed by Pope. In Germany the most conspicuous satirists have been Hagedorn, Kästner, Wieland, Tieck, Goethe; in England in the 19th century the foremost are Byron, Hood, Hook, Jerrold, Thackeray, Carlyle; in the United States James Russell Lowell, through his 'Bigelow Papers,' holds rank among the foremost in political satire.

Satolli, sã-töl'lë, Francesco, Italian ecclesiastic: b. Merciano, Perugia, 21 July 1841. He became professor of dogmatic theology at Urban College of the Propaganda, Rome, and in 1888 was made archbishop of Lepanto. He was the papal representative at the celebration of the

centenary of the establishment of the see of Baltimore in 1889, and returned to the United States in October 1892 in the capacity of appellant judge with extraordinary discretion. His action in regard to several notable Church controversies raised up a party of opposition against some of his proposed measures in ecclesiastical affairs in America. In January of the next year an order came from Rome quelling the opposition and creating Mgr. Satolli permanent American apostolic delegate. He returned to Rome in 1896 and was elevated to the cardinalate. He died 8 Jan. 1910.

Satow, sät'ô, Sir Ernest Mason, British diplomatist b. 30 June 1843. He was educated at University College, London, was made barrister of Lincoln's Inn in 1887, became an interpreter (1865) in the Japanese consular service, and in 1884 was made British agent and consul-general at Bangkok. In 1885 he became minister-resident there, in 1888 at Montevideo, in 1893 envoy extraordinary and minister plenipotentiary to Morocco. In 1895 he was transferred to Tokyo, and in 1900 to Peking. He has edited several books dealing with Japan, prepared (with Ishibashi) an 'English-Japanese Dictionary' (1876), written various papers for the 'Transactions' of the Asiatic Society of Japan, and published: 'The Jesuit Mission Press in Japan' (1888), and 'Exercises in Colloquial Japanese.'

Satrap, sät'râps or sã'trâps, the name given the governors of provinces in the ancient Persian empire. The power of the satrap, so long as he retained the favor of his sovereign, was absolute; he levied taxes at his pleasure and aped the capricious tyranny of his master unchecked. When the monarchy of Cyrus began to decline many of the satraps threw off their allegiance, and founded independent kingdoms of their own. The term satrap is sometimes used to signify a petty despot.

Satsuma (sât-soo'mã) Ware, a fine kind of pottery or semi-porcelain made in Japan, having a felspathic glaze of a light straw color, the surface of which is covered with a net-work of fine cracks. Red and green colors and dulled gold are employed for decorating the ware. Fine old Satsuma ware is highly esteemed by collectors. See ART; JAPAN; PORCELAIN; POTTERY.

Satterlee, sät'tër-lë, Henry Yates, American Protestant Episcopal bishop: b. New York 11 Jan. 1843; d. Washington, D. C., 22 Feb. 1908. He was graduated from Columbia in 1863, ordained in 1867, was assistant rector at Zion Church, Wappinger's Falls, 1865-75, and rector there 1875-82. From 1882-96 he was rector of Calvary Church, New York, and later became bishop of Washington. He was elected bishop coadjutor of Ohio in 1887 and bishop of Michigan in 1899, but declined both positions. His publications include: 'Christ and His Church'; 'New Testament Churchmanship'; 'The Calling of a Christian'; etc.

Satterlee, Walter, American artist: b. Brooklyn, N. Y., 18 Jan. 1844; d. 28 May 1908. He was graduated from Columbia, entered the National Academy of Design and later studied with Edwin White in New York and with Léon Bonnat at Paris. He was an illustrator and painter in genre. He first exhibited at the

National Academy in 1868. Ten years later he became a member, and in 1886 won the Clarke prize. In 1873 he became a member of the American Society of Painters in Water Colors, and he divided his attention between water-colors and oils. His more noteworthy pictures are 'Contemplation'; 'His Eminence the Cardinal'; 'The Peacemaker'; 'Marguerite'; and 'Love Making in Capri.'

Sattler, Samuel Philip, American chemist: b. Pine Grove, Pa., 18 July 1847. He was graduated from Pennsylvania College in 1867, from the Lawrence Scientific School in 1870, afterward studying at the University of Göttingen. He was professor of natural science at Pennsylvania College in 1871-4, occupied the chair of chemistry at the University of Pennsylvania in 1874-91, and has held that chair at the Philadelphia College of Pharmacy since 1878. He has a high reputation as consulting chemical expert, and has published: 'Hand-book of Chemical Experimentation for Lectures' (1870); 'Text-book of Pharmaceutical Chemistry,' with Coblentz (1895); etc.

Saturation, in meteorology. A space is said to be "saturated" with aqueous vapor when its condition is such that the temperature cannot be reduced by the smallest amount without the production of condensation. In meteorology we have to deal mainly with spaces that are filled with ordinary atmospheric air; and hence the phenomena which relate to atmospheric saturation are those which are of the greatest practical importance. The quantity of moisture that is required to saturate a given mass of air is independent of the pressure of the air, but it depends very largely upon the temperature of the air. A given mass of heated air can contain a much greater quantity of moisture than the same mass can retain when cold; and the quantity of moisture that any mass of air can retain without condensation is sensibly equal to the quantity of moisture that would be required to saturate the space occupied by the air, if the air itself were absent. When a given space contains a given quantity of aqueous vapor, the temperature at which the space is precisely saturated is called the "dew-point," corresponding to the quantity of vapor that is present. If water is introduced into a closed vessel from which the air has been exhausted, a portion of it will evaporate, and the evaporation will proceed until the pressure in the vessel, due to the presence of the aqueous vapor, attains a certain definite value, which depends solely upon the temperature of the vessel and its contents. The limiting pressure (or, as it is called, the "tension of the saturated vapor") so attained at various ordinary temperatures, is given in the following table, due to Mr. Glaisher:

Temp. Fahr.	Tension of vapor at saturation in inches of mercury	Temp. Fahr.	Tension of vapor at saturation in inches of mercury
0°	0.044	45°	0.209
5°	0.054	50°	0.361
10°	0.068	55°	0.433
15°	0.086	60°	0.518
20°	0.108	65°	0.617
25°	0.135	70°	0.733
30°	0.167	75°	0.868
35°	0.204	80°	1.023
40°	0.247	....	.....

The condition of the air with respect to saturation is called its "hygrometric state"; and the hygrometric state is defined, so far as its numerical estimation is concerned, as the fraction that is obtained by dividing the tension (or pressure) of the vapor that is actually present, by the tension of the vapor that would be required to completely saturate the same bulk of air, at the observed temperature. The tension of the vapor that is actually present in the air under given conditions may be determined by means of the "hygrometer," an instrument which is made in a great variety of forms. In Regnault's form (which is very accurate, although not well adapted to general use), a polished silver tube is placed in a vertical position, and partially filled with ether, into which a delicate thermometer dips. A current of air is then drawn up through the ether by means of an aspirator, and as the ether is gradually chilled by the consequent evaporation, there comes a time when moisture begins to condense from the air upon the polished exterior of the silver tube. The temperature of the ether is then noted by the thermometer that dips into it; and we take this temperature as the "dew-point" of the air that is in contact with the outer surface of the silver tube. By reference to the table given above, we are then able to determine, at once, the tension of the vapor that is actually present in the air; and upon dividing this by the tension of saturated vapor corresponding to the actual temperature of the air, we obtain the fraction which expressed the "hygrometric state" of the air. Suppose, for example, that the temperature of the air is 70° F., so that if it were saturated with moisture the tension of the vapor that it contains would be equal to the pressure produced by 0.733 inch of mercury. Let us further suppose that the hygrometer shows that dew is deposited upon the silver tube when the temperature falls to 50° F. We should then know that the quantity of vapor actually present in the air is sufficient to produce saturation at a temperature of 50° F.; and by reference to the table we see that this signifies that the actual tension of the vapor present in the air is the same as the pressure due to 0.361 inch of mercury. The "hygrometric state" of the air is then found by dividing 0.361 by 0.733. That is, it is 0.492. The table shows that as the temperature of saturation rises, the corresponding tension of the vapor rises more and more rapidly. It follows from this that when two masses of saturated air mingle, the mixture will in general be more than saturated, and condensation may therefore be expected to ensue, and to continue until the quantity of vapor remaining uncondensed is only sufficient to saturate the mixed mass. The visible evidence of such condensation, in nature, consists in the formation of clouds, or the precipitation of rain. A. D. RISTEEN, PH.D.,

Editorial Staff 'Encyclopedia Americana.'

Sat'urday, so called from the planet Saturn, the seventh day of the week; the *Sabbath* of the Jews. It is called by the Italians *Sabbato*; by the French, *Samedi*; and by the Germans, *Sonnabend* (Sunday eve), or in High German, *Samstag*, a corruption of *Sabbathstag* (Sabbath day); and in Lower Germany, *Saterdag*, of the same origin as the English.

SATURN

Saturn, an ancient Italian divinity, husband of Ops and father of Picus. He was the god of seed time and harvest and is represented as bearing a sickle. He was later identified with the Greek Chronos, who, driven from his supreme throne by Zeus, came to Latium and set up his kingdom there. Under his reign was the Golden Age. At Rome his throne was shared by Ops, afterward identified with Rhea, and in the time of the last Tarquin a temple was built to him at the foot of the Capitol and was afterward used as the treasury (*Saturni Atrium*). The foundations of this temple and eight pillars still remain. The statue of Saturn was all year long swathed in woolen bandages excepting during his festival, the *Saturnalia* (q.v.), when it was uncovered to the eyes of the people.

Saturn, the sixth major planet in the order of distance from the sun. Although this planet is not quite so large as Jupiter, its grand array of rings and satellites renders it the most stupendous object in the solar system. To the naked eye, when near opposition, it shines as a bright star of the first magnitude. Its light is somewhat yellow, bearing a great resemblance to that of Arcturus, both in color and brightness. Saturn, like the other superior planets, is best seen in opposition, when it rises at sunset, and is visible almost the entire night. An opposition occurred about 12 Aug. 1904, and the times to look for it in future years may be found by the rule that it occurs about thirteen days later every year than it did the year before. It will therefore be well seen in the autumn of the years 1906-12 and winter of the years 1913-20. Its time of revolution is 29.6 years, at the end of which period it will return to opposition at the same time as at the beginning, and will present the same general aspect.

The rings of Saturn render it a beautiful and striking telescopic object. They are about 175,000 miles in external diameter, and the central opening of the ring is about 110,000 miles. This makes the breadth of the ring itself, from its inner to its outer circumference, about 32,000 miles, or more than four times the diameter of the earth.

This object was an enigma to the early observers with the telescope. Galileo correctly described it as seeming handles of the planet; a circumstance which, up to the present time, has led to their visible ends being called *ansæ*. As Saturn moved forward in its orbit these handles disappeared from view, owing to the rings being seen edgewise, a circumstance which greatly perplexed Galileo, and encouraged those of his opponents who were disposed to throw doubt on the accuracy of his observations. But the correctness of the latter was shown in a very few years by the reappearance of these seeming handles. The mystery was at last solved by Huyghens in 1656, who, after long and careful study, announced that "the planet is surrounded by a thin, plain ring, nowhere touching it, and inclined to the ecliptic."

When the rings of Saturn are carefully examined with a powerful telescope they are found to be quite complex in their make-up. Shortly after Huyghens made known the real form of the rings, Cassini, of the Paris Observatory, an-

nounced that there were really two rings separated by a fine dark line. The outer one was much narrower than the inner one. The line of separation is called the Cassini division. About 1843, Encke of Berlin, announced that the outer ring was sometimes seen as if divided. Careful study of the appearance makes it probable that there is no real division here, but only a somewhat soft, dark marking round the ring. Shortly afterward, it was announced by Bond and others that there was really a third ring between the two hitherto known and the planet, which had escaped observation because it was very faint and dusky, looking somewhat like a band of crape. This dusky ring was for many years an object of much curiosity on the part of observers; but it is now found not to be a separate ring at all, but only a dark-shaded extension of the inner ring. It is now so easily seen in a good telescope that the failure of the earlier observers to see it suggests a possible change in the object. A suspicion that the inner ring at least was becoming broader and its inner edge approaching the planet, was propounded by Struve, who based his conclusions upon a comparison of drawings and measurements made from the time of Huyghens to that of Herschel. But this change is not considered as established.

The equator of Saturn and also its rings are inclined to the plane of its orbit around the sun by about 27° . As the planet moves round the sun, its axis and hence its equator and rings, preserve the same direction in space, on the same principle than the axis of the earth keeps its direction in going round the sun. Consequently there are equinoxes and solstices for Saturn as for the earth. At the time of the Saturnian equinoxes the plane of the rings passes through the sun. There being two such equinoxes, at opposite points of the orbit, the interval between them will be half the time of revolution of Saturn, or 14.8 years. As the earth is quite near the sun compared with the distance of Saturn, the rings will be seen edgewise from the earth about the time of these equinoxes. They are then found to be so thin as to disappear completely in the most powerful telescope. The last occasion on which this occurred was in 1892; other opportunities will be offered in 1907 and 1922. At intervals intermediate between these times, the rings are seen under the greatest angle, which, however, is never greater than 27° , which is their inclination to the orbit of the planet. At these times it is at its brightest, because the rings are opened out the widest to our view.

Another perplexing question was, how these objects could be kept in place—accompanying the planet in its orbit, and always centred on it, without meeting destruction by falling upon it. A very little mathematical calculation suffices to show that two bodies of this shape ought, on the least disturbance, to be gradually attracted toward the planet on one side or the other, falling upon it as surely as a chair, balanced on one of its legs, will fall to the floor. Laplace suggested that this might be avoided by the rings being liquid and not solid. But it was found by subsequent investigation that a liquid ring would fare no better than a solid one. Professor Benjamin Peirce suggested that the rings might be kept in place by the attraction

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of the satellites. But this suggestion proved no better than the others.

The mystery was at last solved by Professor Clerk Maxwell of England, in a paper on "The Rings of Saturn," which gained the Adams prize essay from the Cambridge University. He demonstrated, by mathematical analysis, that the only objects which could permanently accompany the planet in the way the rings did would be a cloud of small satellites, possibly particles no larger than pebbles. A suggestion of this fact had been made more than a century before by Cassini, but little notice had been taken of it. This announcement made it of great interest to discover whether any other proof could be found for such a view. One consequence of Maxwell's theory is that the rings cannot all revolve together like a solid body, but that the inner portions must revolve more rapidly than the outer ones, the rate of revolution, in every part of the ring, being that appropriate to a satellite in that position. As the particles forming the rings were separately invisible, there was no way of deciding by telescopic observations whether they followed this law of revolution.

It was reserved for Keeler, at the Allegheny Observatory, by the use of the spectroscope, to demonstrate Maxwell's theory by observation. Bringing Saturn and its rings in such a position that they should fall across the slit of his spectroscope, only a single line of light penetrating the slit, it was found that, after being refracted by the prism, the dark lines of the spectrum were not straight, but were broken exactly in a way to indicate that the inner portions of the ring revolved more rapidly than the outer ones.

Saturn is surrounded by a retinue of nine satellites, more than surround any other planet, their distances having a wide range, as will be seen by the table below:

Name.	Dist. from Saturn in radii of planet.	Periodic time.	Discoverer and date.
Mimas	3.3	0 d. 23 h.	Herschel in 1789
Enceladus	4.3	1 d. 9 h.	Herschel in 1789
Tethys	5.3	1 d. 21 h.	Cassini in 1684
Dione	6.8	2 d. 18 h.	Cassini in 1684
Rhea	9.5	4 d. 12 h.	Cassini in 1672
Titan	20.7	15 d. 23 h.	Huyghens in 1655
Hyperion	26.8	21 d. 7 h.	Bond in 1848
Japetus	64.4	79 d. 22 h.	Cassini in 1671
Phœbe	233.0	550 d. 12 h.	Pickering in 1901

Phœbe was discovered at the Harvard Observatory, by photographs of stars surrounding Saturn. It is remarkable in that its motion is retrograde, while that of all other satellites is direct. Its faintness is such that the only telescope which has yet shown it to the eye is that of the Yerkes Observatory, where it was observed with great difficulty by Barnard.

The largest and brightest of these objects is Titan, which may be seen in a telescope of moderate size. The faintest and most difficult is Hyperion, which requires a large telescope to show it. Mimas also is a difficult object to see; but a telescope of three or four inches' aperture will commonly show several besides Titan. The Astronomical Ephemeris gives the apparent orbits and data for each year by which the visible satellites can be readily identified. One difficulty in doing this arises from the small stars which are frequently seen in the neighborhood of the planet.

Japetus, the outer satellite, has the singular peculiarity of being much brighter at the western than at the eastern elongation. The variation of brightness goes on with such regularity that it can be attributed only to one cause—the satellite is darker in color on one side than on the other, and revolves on its axis in the same time that it goes around the planet, thus always presenting the same face to the latter, as the moon does to the earth. Another peculiarity of Japetus is that the plane of its orbit deviates from the planes of all the other orbits. One of the curious features of the Saturnian system is that the rings of the orbits of the seven inner satellites all lie in the plane of the planet's equator. It is known that the planes are thus kept together by the mutual action of all these bodies, combined with the attraction of the equatorial protuberance of Saturn itself.

It will be seen from the distances given in the above table that the satellites are divisible into several groups. The five nearest the planet follow each other at fairly regular and not wide intervals. But the sixth, Titan, is more than twice as far as the one next within it. Hyperion is only a little outside of Titan, and moves in a very eccentric orbit. There is a curious action between these bodies, in consequence of which three revolutions of Hyperion are almost exactly equal to four of Titan; and the motions of the two satellites are so timed that they come into conjunction only at the point where Hyperion is farthest from the planet. These conjunctions occur at intervals of 65 days, during which Titan will have made four revolutions and Hyperion three.

This and other relations which exist between the motions of the satellites have the result that their mutual attractions upon each other give rise to curious results in making first one and then another swing back and forth in their orbits. The mathematical problems thus arising tax the abilities of the ablest investigators of the motions of these bodies.

Physical Constitution and Rotation of Saturn.

—The physical constitution of Saturn would seem to be quite similar to that of Jupiter; but the former, being nearly twice as far as the latter, is more faintly illuminated by the sun, and more difficult of observation. Careful telescopic observations show that Saturn has a slightly mottled or cloudy appearance; but the mottling is so faint that it is impossible to locate any one feature, so as to follow it from hour to hour. It is therefore, as a general rule, impossible to see the rotation of the planet. But on three occasions since the telescope has been used in observing Saturn, a spot or region of unusual brightness has been formed upon its disk which enabled its time of revolution to be observed. The first of these was in the time of the elder Herschel; the second in 1876, when the planet was carefully observed by Professor Hall; and the third in 1903, when a spot was discovered by Barnard and observed by many astronomers. On the second occasion it was found that the spot gradually spread out, the brightest point being near one end, while it gradually faded out at the other end. In consequence of this, it was impossible to fix the period of rotation with entire exactness, because it would depend upon whether we took the brightest part of

SATURNALIA — SAUGER

the belt into which the spot was stretched, or the middle of the belt, as the point of comparison. The results of the time of revolution on the three occasions, so far as worked out, are as follows:

Herschel	10 h. 16 m.
Hall	10 h. 14 m.
Barnard	10 h. 38 m.

Very remarkable is the deviation of the last period from the two others. It is easy to determine what this means. The white spots observed by Herschel and Hall were on or near the planet's equator, while Barnard's spot of 1903 was in middle latitude. We therefore conclude that Saturn is like Jupiter and the sun, in that its equatorial portions rotate in a less period than those nearer the poles.

Saturn also resembles Jupiter in its very small density, which is even less than that of water. We therefore reach the same conclusion as in the case of Jupiter—that the outer visible surface of this planet is probably gaseous; that the planet, in fact, is a ball of vapor surrounding a comparatively dense nucleus.

SIMON NEWCOMB.

Saturnalia, the name of a Roman festival, instituted, according to the popular belief of the ancients, in commemoration of the happy period under the reign of Saturn, when freedom and equality prevailed, and violence and oppression were unknown. It originated probably as a harvest celebration. The festival continued at first one day; then three; afterward five; and finally, under the Cæsars, seven days, namely, from the 17th to the 23d of December. At the commencement of this festival a great number of wax tapers were lighted in the temple of Saturn, as a sign that no more human victims were to be sacrificed. During its continuance no public business could be transacted, the law courts were closed, the schools kept holiday, to commence war was impious, and to punish a malefactor involved pollution. The slaves were freed from restraint, wore caps as badges of freedom, and went about dressed in tunics, adorned with purple, and in white togas. Masters and slaves changed places; and while the servants sat and banqueted at the tables, they were waited on by their masters and their guests, who, if they did not do this, were obliged to submit to all sorts of ridiculous punishments. Jests and freedom everywhere prevailed; and all ceased from their various occupations.

Satur'nian Verse, a metre employed by the earlier Roman poets. It consists of two members; the first an iambic dimeter catalectic, the other a trochaic dimeter brachy-catalectic. It points to the transition from the accentual versification of Etruria and Latium to the quantitative verse of fully developed Roman literature modeled as this latter was on Greek usage. It was originally employed in the hymns to Saturn sung at harvest time, hence its name; and it is also found in extant fragments of Nævius, Livius Andronicus, Ennius, etc. The basis of the metre is thus shown:

— — — — — | — — — — — |

which corresponds with the metre of the old jingle,

There was a man in our town | wondrous wise and cunning.

The metre is met with in all primitive forms of European poetry, whether Spanish, German, or Anglo-Saxon, and is the underlying measure for almost all ballad literature.

Satyr, *sāt'ers* or *sā'ters*, in Greek mythology, a race of woodland divinities, who were followers of Dionysus (Bacchus), and represent the luxuriant vital powers of nature. They are not mentioned by Homer, but Hesiod describes them as a worthless race, unfit for work. They were supposed to be the sons of Hermes (Mercury) and Iphthima, or of Silenus. They appear in early works of art and poetry as robust in human frame with bristly hair, broad snub-noses, ears large and pointed like those of animals, two little horny knobs on their foreheads, and a tail like that of a horse or goat. They are described as being fond of wine (whence they frequently appear with a wine-cup or a thyrsus in their hands), and of every kind of sensual gratification, whence they are often represented sleeping, playing musical instruments, or engaged in voluptuous dances with nymphs. Like all the forest and field deities, they were greatly dreaded by mortals. By later writers, especially the Roman poets, the satyrs are confounded with the Italian Fauns, and are accordingly represented with larger horns and goats' feet, although they were originally quite a distinct class of beings. Ancient sculptors were fond of representing the satyr whether in his coarser or finer type—one of the most famous specimens of Greek art being the Satyr of Praxiteles, in which the revolting animal features of the conception have disappeared, and the satyr is portrayed as a beautiful and graceful youth.

Sauerkraut, *sow'r'krowt*, a salted preparation of cabbage, much esteemed in Germany and other northern European nations, and of which large quantities are prepared for winter use. The common white cabbages are taken when they have formed firm hearts; these are sliced into small pieces and packed in layers in a cask with culinary salt, a few juniper berries and caraway-seeds or cloves being added according to taste, the whole mass being packed down as hard as possible without crushing the slices, and covered with a lid pressed down with weights. Partial fermentation sets in after some time, and the watery juice rises to the surface. This juice is poured off, and water containing a solution of salt is poured in, and changed till it rises without a scum and a fetid smell. The cabbage is then fit for use, and is stored in a cool place in the barrels still under pressure. It may be eaten boiled in the same way as fresh cabbages, or stewed with bacon or salted meat.

Sau'ger, or **Sand-pike**, a fish of the rivers and lakes of the northern Mississippi Valley, a pike-perch of the genus *Stizostedion*, and hence a relative of the wall-eyed pike. The sauger (*S. canadense*) is much smaller than the wall-eyed pike, seldom more than 18 inches long, and 1 to 2 pounds in weight. It varies in quality and estimation both as food and as a game fish, but in some tributaries of the upper Mississippi affords good sport by trolling over ripples with a minnow. Its color is olive-gray, the sides

SAUGERTIES—SAULT SAINTE-MARIE

grassy or orange with dark mottlings, round black spots on the dorsal fins, and a large black blotch on the base of the pectoral fin.

Saugerties, sâ'gér-tiz, N. Y., village in Ulster County; on the Hudson River at the mouth of Esopus Creek, and on the West Shore Railroad; about 12 miles north of Kingston. A ferry connects Saugerties with the New York Central & Hudson River Railroad at Tivoli, on the opposite side of the Hudson, and there are regular steamer communications with all the Hudson River ports. It is in an agricultural region, and has good water-power for manufacturing. In the vicinity are bluestone and limestone quarries. The chief industrial establishments are factories for making writing-paper, blank-books, envelopes, card board, and coated paper for lithographing purposes, and the pulp mills. There are also brick works and the quarries, and the white-lead factory at Glenerie contributes to the prosperity of Saugerties. The manufactures and export products of Saugerties and the nearby villages are shipped mainly from Saugerties by water. The educational institutions are a high school, the public and parish schools, and the Y. M. C. A. library and reading-room. The national and state banks have a combined capital of \$325,000; the savings bank has a large deposit. The government is vested in a president and board of trustees. Pop. (1910) 3,929.

Saugus, sâ'gûs, Mass., town in Essex County; on Lynn Harbor and Saugus River, and on the Boston & Maine railroad; about four miles west of Lynn and 10 miles northeast of Boston. Within its corporate limits are the villages of East Saugus and Cliftondale. It is a residential section with several manufacturing establishments, chief of which are woolen mills, and boot and shoe factories. The town has a high school and graded elementary schools. Pop. (1910) 8,047.

Saul, first king of Israel from about 1040 B.C. He was the son of Kish, a wealthy and powerful Benjamite, was noted for his personal beauty and courage; and when the people became dissatisfied with the theocratico-republican constitution, was selected by Samuel for their king. He was not acknowledged by the whole people until after he had gained a victory over the Ammonites. Repeated successes over the Philistines, Edomites, Moabites, Ammonites, and even over a king beyond the Euphrates, confirmed his authority. But Samuel, offended by the encroachments of the king on the privileges of the priesthood, and by his disobedience to the commands of Jehovah in a war against the Amalekites, secretly anointed David as king. His reign was terminated by a catastrophe. A battle was fought against the Philistines at Mount Gilboa; the Hebrews fled, Jonathan and two other sons of Saul fell, and the king slew himself with his own sword. David, whose skill in poetry equalled his musical genius, honored in a touching elegy the memory of his fallen friend and foe (2 Sam. i.), who, "lovely and pleasant in their lives, were even in their death not divided; they were swifter than eagles, they were stronger than lions."

Sault Sainte Marie, soo sânt mâr'i or (Fr.) sô sânt mâr-rê, Canada, town and port of entry of Algoma District, Ontario; on the Saint Mary

River, the Sault Sainte Marie Canal, and on the Canadian Pacific and Algoma Central railways.

It is connected by the international bridge, 1 mile long, with Sault Sainte Marie, Mich., hence with the Duluth, South Shore, and Atlantic, and the Minneapolis, Saint Paul, and Sault Sainte Marie railways. It is in an agricultural and mining region and is a popular summer resort. In addition to the ship canal around the rapids, Sault Sainte Marie has a large power canal, which already supplies important industries and will supply power to future manufactories. The most important industry is the manufacture of wood-pulp and paper, the large mill at Sault Sainte Marie having cost in construction more than \$1,000,000 and being one of the largest in the world. There are also nickel steel works, utilizing the nickel ores from the Sudbury mines, foundry and machine shops, and lumber mills. The city owns and operates its electric lighting plant and water works. It is the seat of the Anglican Bishop of Algoma and the Roman Catholic Bishop of Northern Canada; has good schools, banks, and weekly newspapers. Pop. (1901) 7,169.

Sault Sainte Marie, Mich., city, port of entry, county-seat of Chippewa County; on Saint Mary River, near the outlet of Lake Superior, on the Sault Sainte Marie (q.v.) ship canal and on the Duluth, S. S. & A. and the Minneapolis, St. P. & S. Ste. M. R.R.'s. The international railroad bridge across Saint Mary River connects the city with the village Sault Sainte Marie in Canada, thus making direct connection with the Canadian Pacific railroad. The principal industrial establishments are lumber mills; other manufactories are machine shops, foundry, planing mills, flour mills, brick works, and shingle mills. It has a shipyard, large lumber yards, and warehouses. The total value of the factory output in 1904 was \$2,412,481, an increase of 230 per cent. over that of 1900. A branch of the State fish hatchery is maintained here. The educational institutions are Saint Mary's Academy, a high school, public and parish schools, and private business schools. The three banks have a combined capital of \$200,000. Pop. (1910) 12,615. The locality has a romantic place in United States and Canadian history, and before the white man it must have been, from its situation, a well-known passing point on Indian trails; it is known to have been one of the favorite fishing grounds of the Chippewa Indians. The French missionaries Rambault and Jogues visited this locality in 1641, followed by Père Ménard in 1660; and a mission was established by Jacques Marquette in 1668, which, however, was abandoned 20 years later, the settlement continuing as a trading post. It was at Sault Sainte Marie that the governor-general of New France gathered a great council of Indians in 1671 and in the name of the King of France took formal and solemn possession, by proclamation, of all the country south to the Gulf of Mexico and west to the Pacific Ocean.

Sault Sainte-Marie, Saint Marys Falls, or the "Soo" Canals. The early trappers and traders of the Northwest found free navigation insuperably impeded by the sault, or rapids, of the St. Marys River, whose descent of 18 feet to the mile compelled costly portaging of the increasing cargoes of furs and merchandise.

Finally, the Northwest Fur Company, seeking to gain an advantage over its rival, the Hudson's Bay Company, constructed a canal with a single lock on the Canadian side of the falls. This was in 1797-8, and the canal was in use by canoes and bateaux until 1814, when all but its timber floor and sills was destroyed by United States troops. No further attempts at canal building in this remote spot were made until 1853, when a ship canal—the first within the borders of the United States—was begun by the State of Michigan, to connect Lakes Superior and Huron, and was finished in 1855. The length of the canal was 5,674 feet and it was provided with two tandem locks, each being 350 feet in length and 70 feet wide, and allowing passage of vessels drawing 12 feet, the original cost being \$1,000,000. The United States government, by consent of the State, began in 1870 to enlarge the canal, and by 1881 had increased its length to 1.6 miles, its width to an average of 160 feet, and its depth to 16 feet; also had built a single lock 515 feet long and 80 feet wide, with a depth of 17 feet on the sills, which was located 100 feet south of the State locks. The State relinquished all control of the canal in March 1882. In 1887 the State locks were torn down and replaced by a single lock 800 feet long, 100 feet wide, and a depth of 22 feet of water on the sills. This lock called the "Poe" lock was put in commission in 1896. The canal was also deepened to 25 feet. From 1892 to 1903 many millions of dollars have been expended in laying out a new and straighter route through Hay Lake and other channels eliminating a number of short turns and giving dredged areas over 30 miles in length. This has been one of the chief causes of the reduction of the cost of the freight-ton through the canal from 13.57 mills in 1882 to 3.53 mills in 1909.

A new work of great importance has been under way since 1907, which cannot be completed until 1917. It consists of the widening and deepening of the canal above the locks and in the Middle Neebish channel, and the construction of the new canal and the great Davis lock. The first two parts of this work were completed in 1910, the result being that the canal is now 500 feet wide at the upper entrance, 270 feet at the basin, 108 feet at the lock gates, and 1,000 feet wide at the lower entrance. The improved Middle Neebish channel is now 300 feet in width and has 22 feet of water over the rock at mean low stage level of Lake Huron. These improvements alone will relieve much congestion of traffic. The excavations for the mammoth Davis lock were completed early in 1912 and allow for a lock chamber 1,350 feet long and 80 feet wide; the new canal will have, including the lock, a length of 1¾ miles, and a clear width of from 260 to 300 feet. A separate and free waterway is also being constructed to feed the new locks.

Besides the canals on the American side of the international line, the Dominion government opened a large Canadian canal in 1895. This canal is 1½ miles long, 150 feet wide, and 22 feet deep, with a lock 900 feet long and 60 feet wide, with 22 feet on the mitre sills.

The commerce passing through these canals in eight months of the year is far greater than is borne by the Suez Canal, the Kiel Canal and

the Manchester Canal combined in a whole year; the commerce of the Erie Canal, the Welland Canal and the canals of the St. Lawrence may be added and the aggregate will still fall short of the tremendous tonnage passing through the "Soo" canals. It reached in 1910 a total of 62,363,218 tons—an increase of 4,468,069 over 1909.

Saumarez, sô-mâ-râ', or Sausmarez, James, BARON DE, British naval officer; b. Saint Peter Port, Guernsey, 11 March 1757; d. there 9 Oct. 1836. He served in the American war; was raised to the rank of commander after the engagement between the English and Dutch in 1781; and was captain of the *Russell* in the combat between Rodney and De Grasse. In 1793 he was knighted for the capture of the *Réunion*, a French frigate. In March 1795 he was appointed to the command of the *Orion*, in which ship he opened the battle of L'Orient, in which the French fleet was defeated, 23 June; he shared in the victory off Cape Saint Vincent, 14 Feb. 1797, and was second in command to Lord Nelson in the victory of the Nile 1 Aug. 1798. In 1801 he was made rear-admiral, created a baron, and appointed to the command of the squadron cruising off Cadiz. He defeated a Franco-Spanish fleet of 10 sail of the line and four frigates. At the beginning of the war with Russia (1809) he commanded the Baltic fleet. In 1821 he became vice-admiral of Great Britain, was raised to the peerage of the United Kingdom with the title of Baron de Saumarez, of Saumarez, in 1831, and thenceforth lived in retirement. Consult: Ross, 'Memoirs of Admiral Lord de Saumarez' (1838).

Saunders, sän'derz, Alvin, American legislator; b. Fleming County, Ky., 12 July 1817; d. Omaha, Neb., 1 Nov. 1899. He removed with his parents to Illinois in 1828, and at 16 went to Iowa. He studied law, was postmaster for seven years, and eventually became a banker. He was a member of the convention which framed the constitution under which Iowa was admitted to statehood, was State senator for eight years, and a commissioner to organize the Pacific Railroad Company. In 1861-7 he was governor of the Territory of Nebraska, and during the Civil War sent 3,000 troops to the front besides repelling the attacks of the Indians, although the entire population of the Territory numbered but 30,000. He served in the United States senate in 1877-83, was active in the movement for the resumption of specie payment, secured a labor school for the Indians on the Pawnee Reservation, obtained 600,000 acres for Nebraska by straightening its northern boundary line, and was prominent as a commissioner on Indian affairs.

Saunders, Marshall (MARGARET MARSHALL SAUNDERS), Canadian author; b. Milton, N. S., 1861. She was educated in Nova Scotia, Scotland, and France, and is well known as a successful writer of juvenile books. Her publications include: 'Beautiful Joe' (1894); 'The King of the Park' (1897); 'Her Sailor' (1899); 'Tilda Jane' (1901); 'Beautiful Joe's Paradise' (1902); etc.

Saunders, Richard, the name under which Benjamin Franklin published his 'Poor Richard's Almanac,' 1732-57.

Saunders, Thomas Baily, English author: b. Alice, Cape Colony, 2 Dec. 1860. He was educated at King's College, London, and at University College, Oxford, became a barrister in 1886, and has since engaged in literary work. He has made translations of much of the work of Schopenhauer and Goethe and has written: 'Life and Letters of James McPherson' (1893); 'The Quest of Faith' (1899); 'Prof. Harnack and His Oxford Critics' (1902); 'Schopenhauer' (1901); etc.

Saunderson, sän'dér-són, Nicholas, English mathematician: b. Thurlston, Yorkshire, January 1682; d. Cambridge, England, 19 April 1739. He was blinded by smallpox when a year old, and debarred through poverty from a university course, but nevertheless obtained a wide knowledge of the classics and mathematics. In 1707 he established himself as a lecturer at Christ's College, Cambridge, and in 1711 was appointed to the chair of mathematics at Cambridge, which he occupied until his death. His 'Algebra' was published at Cambridge in 1740.

Saurel, a fish. See SCAD.

Sauria, sâ'ri-ä, a term variously applied in the classification of the reptiles, but in this work restricted to designate the subclass composed of the orders *Lacertilia* (lizards) and *Ophidia* (serpents). In popular speech the phrase "saurian reptiles" usually means alligators or crocodiles. See REPTILES.

Saurin, Jacques, zhäk sô-rän, French Protestant preacher: b. Nîmes 6 Jan. 1677; d. The Hague 30 Dec. 1730. After study at Geneva, he became pastor in 1701 of a Walloon congregation in London; but in 1705 went to The Hague to take charge of a church of French refugees assembling there in a chapel of the Prince of Orange. Here his pulpit oratory was so greatly admired that it roused the bitter envy of his clerical brethren, who charged him with heresy, and subjected him to a series of petty persecutions which shortened his life. His doctrines were those of moderate Calvinism. As a pulpit orator he has been likened to Bossuet, and so far as vigor of presentation goes this may be thought just. He was the author of 12 volumes of 'Sermons,' selections from which were translated into English, and published between 1775 and 1784, in five volumes (with a 'Memoir'), a sixth being added in 1796. Among his other works are 'Etat du Christianisme en France' (1725); 'Abrégé de la Théologie et de la Morale Chrétienne' (1722); 'Discours sur les Evénements les Plus Mémorables du Vieux et du Nouveau Testament' (1720-8). Consult 'Life' by Berthault (1875).

Sauropoda, sâ-röp'ô-dä, a sub-order of dinosaurian reptiles which included gigantic forms, such as *Brontosaurus*, *Morosaurus*, *Diplodocus* and the like. (See DINOSAURIA.) It is difficult, remarks Gadow, to understand how these huge, long-necked *Sauropoda* lived and moved about. The long neck suggests at first sight predaceous habits, but the teeth, rather feeble in *Diplodocus*, and distinctly of the plant-cutting type in other genera, put this out of the question. The high position of the impaired nasal opening, and the shortened nasal bones of

Diplodocus are features indicative of aquatic habits, but the short-toed plantigrade limbs are absolutely adapted to terrestrial life, and we cannot well assume that such enormous brutes as *Atlantosaurus* could possibly have ventured into swampy ground.

Saurop'sida, a primary division of vertebrated animals, comprising the reptiles and birds, the other two corresponding divisions being the *Ichthyopsida* (fishes and amphibians) and the *Mammalia*. These divisions, set apart by Huxley, are in accordance with genetic relationships. For the similarities in structure between birds and reptiles, showing descent from a common sauropsidan ancestor, see ORNITHOLOGY; REPTILES.

Saururæ, the name given by Huxley to an order of the class of Birds (see ORNITHOLOGY), constructed for the reception of *Archæopteryx* (q.v.) a fossil bird, the oldest and most primitive bird-fossil known, remarkable for its lizard-like tail.

Sau'ry-pike, or **Skipjack**, a fish (*Scomberesox saurus*), having a greatly elongated body covered with minute scales, and the jaws prolonged into a long sharp beak. It is about 15 inches long, occurs plentifully on the North Atlantic coasts, frequenting inlets in shoals so dense that it may be taken in painfolds. In order to escape the pursuit of the porpoise and large fishes it often leaps out of the water or skims rapidly along the surface. Consult Goode, 'American Fishes' (1888).

Sausage, an article of food consisting of minced meat, highly seasoned, and enclosed generally in the intestines of some animal. Among the Romans the sausages of Lucania were held in high repute; they were made of fresh pork and bacon finely minced with nuts of the stone-pine, and flavored with pepper, cummin seed, bay leaves, pot-herbs, and garum. The Bologna sausages of Italy are still highly prized; they consist of veal, salt beef, salt pork, and bacon, finely chopped up, seasoned with sage, mixed herbs, ground pepper, and mixed spice. The smoked sausages of Germany are also considered as a delicacy by many; they are made of fat and lean pork preserved for about a week by salt, saltpetre, black pepper, and all-spice being rubbed into the meat; it is then cut small and mixed with some shreds of shallot or garlic, pressed into an ox-skin, wrapped in a fold or two of muslin, and then smoked in the same way as ham. The pork sausages of our own country are made and seasoned in various ways to please different palates. See PACKING INDUSTRY.

Saussure, sô-sür, **Horace Bénédicte de**, Swiss savant: b. Conches, near Geneva, 17 Feb. 1740; d. Geneva 22 Jan. 1799. He began his studies in natural science in Geneva and at 22 was appointed professor of philosophy. Later he was elected member of the Council of Two Hundred in the new legislature of his country. His name has since become famous from his services to geology, geodesy, the geographical distribution of plants, and the applied sciences. His most remarkable work was done in the investigation of plant anatomy. In pursuit of his chosen studies he traveled through France, Holland, England, Italy and Sicily; thoroughly exploring the Alps, especially the glaciers of Chamounix, and was the first to reach the summit of

SAUTERNE—SAVAGE STATION

Mont Blanc (1787) and to measure its height by barometric pressure. He is also the inventor of the electrometer, hygrometer and similar instruments. As founder and president of the Society of Arts of Geneva he did good service to the industries of that city. Among his writings the most important are 'Voyages dans les Alpes' (1779); and 'Partie Pittoresque' (1890).

Sauterne, *sô-têrn*, a white Bordeaux wine of high repute, produced from grapes grown in the neighborhood of Sauternes, a village in the department of Gironde, near Bordeaux.

Savage, James, American antiquarian: b. Boston, Mass., 13 July 1784; d. Boston 8 March 1873. He was graduated from Harvard in 1803, studied law, was admitted to the bar, served in both branches of the legislature, and then retired from political life to engage in literary work. He published numerous historical and political pamphlets, and edited many works concerning New England history. His work is unfortunately marred by a partisan spirit and is somewhat confused in plan. He wrote: 'Genealogical Dictionary of the First Settlers of New England, showing three Generations of those who came before May 1692' (4 vols., 1862-4); and edited: Winthrop's 'History of New England' (1825-6); Paley's 'Works' (5 vols. 1828); etc.

Savage, Minot Judson, American Unitarian clergyman: b. Norridgewock, Maine, 10 June 1841. He was graduated from the Bangor Theological Seminary in 1864 and was a Congregational home missionary in California 1864-67. Here he established churches in Grass Valley and San Mateo. Subsequently he occupied Congregational pulpits in Framingham, Mass., 1867-9; and Hannibal, Mo., 1869-73. Having become a Unitarian he took charge of the Third Unitarian Church in Chicago 1873-4, and a year later became the pastor of the Church of the Unity in Boston, in which capacity he served 22 years. In 1896 he accepted a call to the Church of the Messiah in New York, a church long associated with the Rev. Robert Collyer, now (1906) its pastor emeritus. He resigned the pastorate in May 1906. He represents the more radical element in his denomination and has been a voluminous writer upon ethical and religious questions. Among his more important works are: 'Christianity the Science of Manhood' (1873); 'The Religion of Evolution' (1876); 'Social Problems' (1886); 'My Creed' (1887); 'Religion for Today' (1897); 'Our Unitarian Gospel' (1898); 'Life Beyond Death' (1901); 'The Passing and the Permanent in Religion' (1901).

Savage, Richard, English poet: b. London 10 Jan. 1698 (?); d. Bristol 1743. He claimed to be the illegitimate son of Anne, Countess of Macclesfield, by Richard Savage, Earl Rivers, but was probably the son of a woman who had been employed to nurse a natural son of the countess by that earl. This child, according to the countess, died when quite young, and she declared that Savage was an impostor. Savage was apprenticed to a shoemaker, having probably received some education at a grammar-school near Saint Albans. He turned to literature and became an author as a means of livelihood. His first work, a pamphlet on the Bangorian controversy, was followed by two comedies, 'Woman's a Riddle,' performed in 1716, and 'Love in a Veil.' These procured him the ac-

quaintance of Sir Richard Steele and Wilkes, the actor. His tragedy 'Sir Thomas Overbury,' was brought out in 1723, the author himself playing the leading part, but with little success. Savage was rising in reputation when, in 1727, he killed a man in a tavern brawl. He was tried and sentenced to death, but through the influence of Lady Hertford was pardoned. In 1728 appeared 'The Bastard,' a poem of some merit. Soon after, Lord Tyrconnel (a nephew of his alleged mother) received him into his house, and allowed him £200 a year. In 1729 he published 'The Wanderer: a Moral Poem.' A quarrel with his patron once more turned him adrift upon the world. A birth-day ode addressed to Queen Charlotte in 1732 procured him a pension of £50 from the queen. In 1735 a satire against the clergy, entitled the 'Progress of a Divine,' caused a prosecution to be instituted against him; but the information was dismissed. From this period he appears to have sunk into the lowest misery. The death of the queen and the loss of his pension completed his ruin, although Pope and a few friends raised a subscription with a view of enabling him to reside in Wales. But at Bristol he was arrested for debt and thrown into the county jail, where, after a detention of some months, he died. Besides the works above mentioned, he was the author of much occasional verse and other miscellaneous writings. Savage was the friend and companion of Samuel Johnson at the time when the latter was sleeping in the streets of London houseless and penniless. Consult: Johnson, 'Life of Savage' (1744); Galt, 'Lives of the Players'; Boswell, 'Life of Johnson'; Thomas, in 'Notes and Queries' (1858).

Savage, Richard Henry, American soldier and novelist: b. Utica, N. Y., 12 June 1846; d. New York 11 Oct. 1903. He was graduated from West Point in 1868 as brevet 2d lieutenant, and in 1871 served as vice-consul of the United States at Rome and Marseilles. In 1872 he was military secretary, with the rank of major, in the Egyptian army and in the latter part of 1872 and during 1873 was United States Commissioner to Texas, to settle the Mexican-Texas border dispute. During the Spanish-American war he served as senior major of the United States volunteer engineers. He was a voluminous writer, published among other books: 'My Official Wife,' which has been translated into 17 languages; 'For Love and Life'; 'In the Shadow of the Pyramids'; 'Brought to Bay'; 'The Midnight Passenger' (1900).

Savage Island, or **Nine**, an island of the South Pacific, 40 miles in circumference, and lying between the Samoa and Tonga groups. It is very fertile. Chief products—copra, coffee and fruit. Trade is almost exclusively with New Zealand, to which it was annexed in 1901. The inhabitants are a mixed race of Samoans and Melanesian. They are a quiet people and have become Christians. They speak a Samoan dialect.

Savage Station, Battle of. While Gen. Sumner was engaging Gen. Magruder at Peach Orchard or Allen's Farm (q.v.) on the morning of 29 June 1862, Gen. Franklin was informed that "Stonewall" Jackson, after repairing the bridges, was crossing the Chickahominy in force and advancing toward Savage Station. Frank-

SAVAII ISLAND—SAVANNAH

lin immediately withdrew Smith's division from an isolated and exposed position on Sumner's right and notified Sumner, who at 12 o'clock fell back $2\frac{1}{2}$ miles to Savage Station and united with Franklin, who had Smith's division only, Slocum's having been sent by McClellan across White Oak Swamp. McClellan had ordered Heintzelman, with his corps, to hold the Williamsburg road until dark, at a point where were several field-works, and a skirt of timber between these and the railroad; but through a misunderstanding of his orders, and being convinced, he says that the whole open space near Savage's was crowded with troops, more than he supposed could be brought into action judiciously, in the afternoon he marched his entire corps, except two batteries, to the rear across White Oak Swamp, without orders from any one, and without a word to Sumner, who, by seniority, was in command, McClellan not being on the field. On reaching Savage Station, Sumner and Franklin drew up in line of battle in a large open field to the left of the railroad, the left, held by Sumner, resting on the edge of the woods, Richardson's division forming his right, Sedgwick's his left. Smith's division on the right extended down to the railroad, with Hancock's brigade reaching into the woods to the right and front to hold the railroad. Davidson's brigade was in reserve, and Osborn's battery was on the line. It was after these dispositions had been made that Heintzelman withdrew and imperiled the left of Sumner's line. Magruder had slowly and cautiously followed Sumner from the Peach Orchard and it was near 5 o'clock when McLaws' division, moving along the Williamsburg road and through the timber that Heintzelman was supposed to be holding, began an attack upon Sumner's left, and was held in check by the vigorous fire of Sumner's artillery. McLaws pressed his attack with great impetuosity, and a hotly contested fight took place on the Williamsburg road. Six regiments of Sedgwick's division, followed by one of Richardson's, were hastened to the threatened point; Brook's Vermont brigade was thrown into the woods that Heintzelman had abandoned, six batteries opened fire, and at dark, after partial success on either side, the battle ceased, with Sumner's line intact, and the Confederates repulsed. A novel feature of the engagement was the use by the Confederates of a 32-pounder gun, mounted on a platform-car, plated with iron, which was pushed down the railroad, and sent its shells into Sumner's line. Soon after the cessation of the fight, and the destruction of a large amount of supplies, Sumner continued the retreat across White Oak Swamp, abandoning to the Confederates 2,500 sick in the hospitals. McLaws reports a loss of 345 killed and wounded; the total Confederate loss was about 400 killed, wounded, and missing. The Union loss is not accurately known.

Consult: 'Official Records,' Vol. XII.; Webb, 'The Peninsula'; Walker, 'History of the Second Army Corps'; Allan, 'Army of Northern Virginia'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. II.

E. A. CARMAN.

Savaii (sā-vī'ē) Island. See SAMOAN ISLANDS.

Savanilla, one of the names of the great tarpon (q.v.).

Savannah, sa-văn'a, Georgia, city and capital of Chatham County, located on the Savannah River, 18 miles from its mouth. It is the northern terminus of the Savannah, Florida & Western Railroad, now a part of the Atlantic Coast Line system; the eastern terminus of the Central of Georgia Railway; the southern terminus of the Charleston & Savannah Railroad, a part of the Atlantic Coast Line, and the chief South Atlantic terminus of the Southern Railway and the Seaboard Air Line systems, thus being one of the most important railroad centres in the South. It has regular steamship and sailing connections with Boston, New York, Baltimore, Philadelphia, and other ports.

Parks and Monuments.—The streets are wide and beautifully shaded, and intersected with parks or squares at regular intervals. In Johnson, Monterey, and Madison squares are monuments to Nathaniel Greene, Count Pulaski, and Sergeant Jasper, heroes of the Revolution. In Forsyth Place stands a monument to the Confederate dead. There is also a monument to Tomochichi, the Indian chief, and other public memorials.

Public Buildings.—The city has a County Court-House, United States Post-office and Court-House, City-Hall, Custom-House, Arsenal of the First Battalion Heavy Artillery, Armory of First Regiment of Infantry, Chamber of Commerce, Cotton Exchange, Board of Trade, Saint Joseph's Hospital, Episcopal Orphans' Home, Savannah Hospital, Telfair Hospital for Females, Masonic Temple, Theatre, Odd Fellows' Hall, Georgia Historical Society, Public Library, Telfair Academy of Arts and Sciences, and many large buildings of modern architecture. Ten miles from the city is the Bethesda Orphan House, founded by Rev. George Whitefield in 1740.

Government.—The city is governed by a mayor and city council. The annual cost of maintaining the municipal government is about \$900,000. The artesian waterworks system with 58 miles of mains, cost \$1,250,000. The city has an area of 7 square miles with 98 miles of streets, of which 35 miles are paved. The sewer system covers 18 miles of mains. The streets are lighted by electricity at an annual cost of \$39,000; the police department costs annually about \$90,000, and the fire department \$85,000.

Manufactures.—In 1900 Savannah had 155 manufacturing establishments, employing a capital of \$5,716,491 and 2,870 persons; paying \$1,176,150 for wages and \$3,915,884 for materials. The combined output for 1900 was \$6,461,816. The number of industries and their products has largely increased since 1900. The industries include fertilizer plants, cottonseed-oil mills, iron foundries, saw-mills, planing mills, rice and flour mills, cotton mills, furniture, sash, door and blind, broom and varnish factories, machine shops, ice factories, printing offices, book-binderies, a lithographing establishment, breweries, etc. It has also two daily and several semi-weekly newspapers. The assessed property valuation in 1903 exceeded \$41,000,000 and the total bonded debt was about \$3,000,000.

Banks and Banking.—There are two national and seven state banks with a total cash capital of more than \$4,000,000 and a surplus of \$1,500,000. The bank clearances for the year ending 31 Dec. 1903 were \$195,265,562.

Commerce.—Next to New Orleans, Sa-

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vannah is the most important commercial city in the South. It is the greatest cotton port on the Atlantic coast of the United States. It has a water frontage of 6 miles. The largest sea-going vessels load at the city wharves, and the river is navigable by steamers as far as Augusta. It has large exports of cotton, rice, lumber, fertilizers, tobacco and naval stores. For the year ending 31 Dec. 1903 the value of the exports aggregated \$58,566,773.

Churches and Schools.—Prominent among the church buildings are Christ Church, Wesley Monumental Church, Trinity Methodist Church, First Baptist Church, Saint John's Church, Saint John's Roman Catholic Cathedral, Hebrew Synagogue Mickva Israel, and Independent Presbyterian Church. There are over 30 churches in the city, 13 of which are for colored congregations. The city also has the convent of Saint Vincent de Paul and an excellent public school system. There are 9,000 enrolled pupils in the public schools, which are maintained at an annual expense of \$125,000.

History.—Savannah was founded by General James Oglethorpe in 1733 and was chartered in 1789. In 1778 the British captured the city. In October of the following year it was besieged by the American and French forces, and in a battle fought on the 9th of that month the combined armies were defeated. In this assault Count Pulaski was mortally wounded. The town remained in the possession of the British until the close of the Revolutionary War. During the Civil War the city was a prominent depot of supplies for the Confederate armies and was the objective point of Gen. Sherman in his march to the sea. After a brief defense it was evacuated by the Confederates and the Union Army took possession 21 Dec. 1864.

Population.—In 1850 the population was 15,312; (1860) 22,292; (1870) 28,235; (1880) 30,709; (1890) 43,189; (1900) 54,244. The corporate limits of the city have since been extended and the population in 1910 had increased to 65,064.

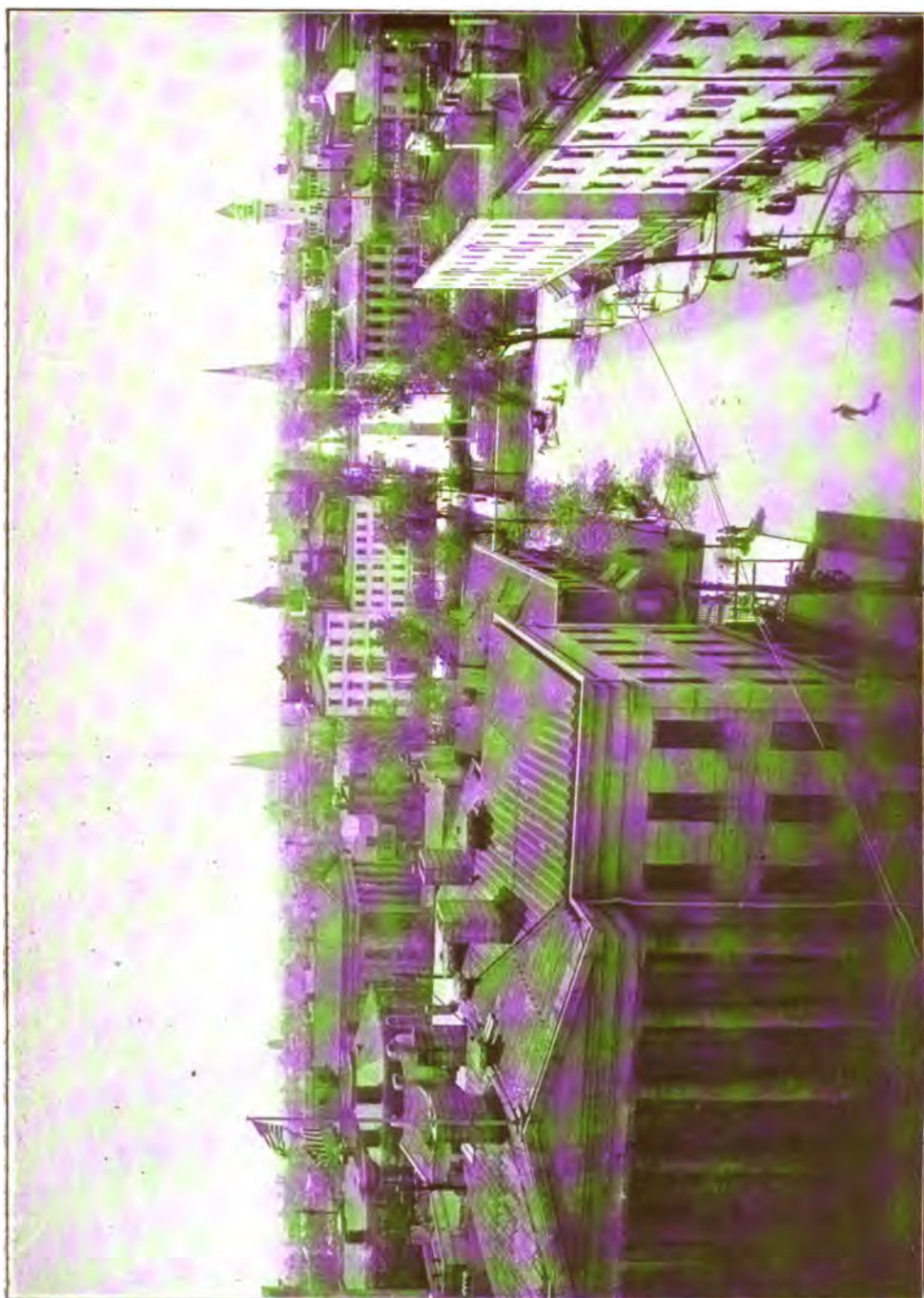
J. H. ESTILL,

Editor 'Savannah Morning News.'

Savannah, Mo., city, county-seat of Andrew County; on the Chicago, G. W. and the Kansas City, St. J. & C. B. R.R.'s; 13 miles north of Saint Joseph. It was settled in 1842 and was incorporated as a city in 1854. It is the centre of an agricultural, fruit-growing, and stock-raising region; and has a flour mill and a creamery. The city has a public high school with a school library of over 700 volumes (1904). Pop. 2,000.

Savannah, a river formed by the junction of the Tugaloo and Seneca rivers, and which, from its source, forms the boundary between Georgia and South Carolina. The length of the channel from its source to its mouth is 450 miles, but from the source to the mouth in direct line is only 250 miles. The area of the drainage basin is about 8,500 square miles. The current in the upper part of its course is rapid; considerable quantities of silt are brought down each year, and bars form in the broad portions of the stream where the current moves slowly. The tidal wave ascends to a point about 25 miles above Savannah. At Savannah the rise and fall of the tide is six and one half feet. The river is navigable for small vessels to Augusta, 230 miles, and for large vessels as far as Savannah.

Savannah to Goldsboro, Sherman's Campaign from (including the battles of Averasboro and Bentonville). Sherman's March to the Sea (q.v.) culminated in the capture of Savannah 21 Dec. 1864. It was a brilliant campaign, but of minor importance compared with that upon which he immediately prepared to enter. He says: "Were I to express my measure of the relative importance of the march to the sea, and of that from Savannah northward, I would place the former at one, and the latter at ten, or the maximum." Before the capture of Savannah Sherman had received from Gen. Grant, a letter dated 6 December, in which he had given his idea of Sherman's further movement, which was to establish a base on the sea-coast, fortify it, leave all artillery and cavalry, and enough infantry to protect them and threaten the interior, so that the militia of the South would have to be kept at home, and with the remainder of his command take transports for James River, join Grant before Richmond, and participate in the destruction of Lee's army and the overthrow of the Confederacy. Sherman replied: "I had expected, after reaching Savannah, instantly to march to Columbia, S. C., thence to Raleigh, and then to report to you." After the surrender of Savannah, Grant (27 December) accepted Sherman's plan and instructed him to start on his expedition northward without further delay, break up the railroads in South Carolina and North Carolina, and join the armies operating against Richmond as soon as he could and by the route he deemed best. Sherman hastened his preparations; Gen. Grover's division of the Nineteenth corps was detached from the Army of the Shenandoah and ordered to Savannah as a garrison, and Gen. Foster, commanding the Department of the South, was instructed to follow Sherman's inland movements by seizing in succession Charleston and other points on the coast, which might be abandoned. Ammunition, rations, and clothing were accumulated, and 14 Jan. 1865 the Seventeenth corps, Gen. Blair, took transports at Savannah for Hilton Head, S. C., and moved to Beaufort, thence to Pocotaligo, on the Charleston & Savannah Railroad, thus threatening Charleston. Later the Fifteenth corps, except Corse's division, joined the Seventeenth. The left wing, Fourteenth and Twentieth corps, under Gen. Slocum, with Corse's division and Kilpatrick's cavalry, moved up the Savannah River, 40 miles, to Sister's Ferry, thus threatening Augusta. When Slocum arrived at Sister's Ferry the river had overflowed its banks and submerged the adjacent lowland, and there was a delay of some days before the waters had fallen sufficiently for a crossing. On 1 February, when the general movement began, the army was composed of two wings: the right wing, under Gen. O. O. Howard, consisted of the Fifteenth corps, Gen. John A. Logan, and the Seventeenth corps, Gen. F. P. Blair; the left wing, under Gen. H. W. Slocum, consisted of the Fourteenth corps, Gen. J. C. Davis, and the Twentieth corps, Gen. A. S. Williams. The cavalry division, under Gen. Kilpatrick, moved with the left wing, as also, at first, Corse's division of Logan's corps. The strength of the army 1 February was 53,923 infantry, 4,438 cavalry, and 1,718 artillery, in all 60,079 men with 68 guns. There were about 600 ambulances, 2,500 wagons, and provisions for 20 days, mostly of bread, sugar.



A VIEW OF SAVANNAH, GA.

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coffee, and salt. Beef cattle were driven and it was expected that a good supply of cattle, hogs, and poultry would be gathered on the march. The disposition of the forces from Sister's Ferry on the left to Pocotaligo on the right menaced Augusta, Columbia, and Charleston, and left the Confederates in doubt as to the true point upon which Sherman was to move. The Confederates, under Gen. Hardee, whose headquarters were at Charleston, and who had about 16,000 men, occupied the line of the Salkehatchie River, while Wheeler's cavalry operated on the heads and flanks of the advancing column. On 1 February the movement began. Howard's right wing marched from Pocotaligo for the Beaufort and Rivers' bridges of the Salkehatchie, for the purpose of pushing on to the Edisto River, thus flanking Charleston. There was a sharp engagement (3 February) at Rivers' bridge, in which two divisions of Blair's corps waded breast deep through the swamp and carried the bridge with a loss of 88 killed and wounded, the Confederate loss being 52 killed and wounded. The Confederates, driven from the line of the Salkehatchie, retreated to Branchville, behind the Edisto, burning the bridges behind them. The left wing, under Slocum, marched through Barnwell, and on 10 February both wings were in the vicinity of Branchville on the Charleston and Augusta Railroad. Kilpatrick on the left, went as far as Aiken and threatened Augusta. From Branchville the railroads in every direction were thoroughly destroyed, and the army started for Columbia, each of the four corps taking a separate road. Howard went by the Orangeburg road, and on the 16th his head of column approached Columbia, which was occupied by Gen. C. L. Stevenson's division of infantry, and Butler's and Wheeler's divisions of cavalry, in all about 5,000 men. Stevenson fell back to Winnsboro, leaving Wade Hampton, commanding the cavalry, to follow. On the 17th the Fifteenth corps marched through the city and encamped beyond it on the Camden road. During the night the greater part of the city was accidentally burned. Slocum, advancing by Barnwell and Lexington, destroyed the Charleston and Augusta Railroad for several miles and, after menacing Augusta, received orders to cross the Saluda River, at Mount Zion's Church, above Columbia. During the night a bridge was constructed and next day Slocum and Kilpatrick crossed, passed over Broad River and, on the 21st arrived at Winnsboro, destroying on the way several miles of railroad north and south of Alston. Sherman, with the right wing, marched from Columbia, on the 20th, on the direct road to Winnsboro, and threatened Charlotte, N. C. He destroyed the railroad between Columbia and Winnsboro, and joined Slocum at the latter place. On the day that Sherman occupied Columbia Gen. Hardee evacuated Charleston, after destroying the public buildings, two iron-clad steamers, cotton and other property, and with about 14,000 men moved to Cheraw, on the Pedee River, and thence by a long march to Fayetteville, N. C. Next day Charleston was occupied by the Union troops of Gen. Foster, who found 450 abandoned guns. The city had been fired, churches and private residences burned, and everything presented a scene of desolation. Sherman, in his march, had made a clean swath of 40 miles, burning bridges, wrecking railroads, and devouring nearly every-

thing. Each family was left a reasonable amount of food, but all horses, mules, and wagons were taken. From Winnsboro Slocum destroyed the railroad as far north as Chester, threatened Charlotte, and then, forcing to the left the Confederates who were concentrating to dispute the march on Charlotte, the entire army turned eastward for Fayetteville, Slocum crossing the Catawba River at Rocky Mount and joining Howard, who had marched by roads further south, at Cheraw (3 March), where were found 24 guns, 3,600 barrels of gunpowder, and large supplies of stores, public and private, sent from Charleston for safe-keeping. Hardee made no opposition to the occupation of the place, and retreated to Fayetteville, leaving Wade Hampton's cavalry to cover his rear and burn the bridges behind them. On the 6th Sherman resumed his march on Fayetteville, by four different roads, and reached it on the 10th, Hardee again retreating without a show of defense, leaving Wade Hampton to skirmish with Sherman's advance and burn the bridge over the Cape Fear River. Kilpatrick, covering the movement on Sherman's left and rear, was surprised on the night of the 9th by Hampton's cavalry and pretty roughly handled, being driven from his camps and losing all his guns, which, however, he regained. He lost 183 men, of whom 103 were captured. The march through South Carolina had been greatly delayed by almost incessant rains and the swampy nature of the country. Nearly all the way the army was compelled to corduroy the roads before the trains could be moved, in some instances the first corduroying was out of sight before the trains had all passed, and another road was laid over it. All this was done cheerfully by the men, working in icy water up to their knees. Before reaching Fayetteville it was heard that Gen. Terry had taken Wilmington, and the day after the arrival of the army a Union steamer came up Cape Fear River, confirming the news and bringing mails and dispatches. Having thoroughly destroyed the arsenal buildings, foundries, and machine-shops at Fayetteville, the army crossed Cape Fear River on the 13th and 14th for Goldsboro. the objective point of the campaign, where it was to unite with Gens. Schofield and Terry, who were marching on that place from Newbern and Wilmington. It was now known that Gen. J. E. Johnston had been ordered to delay Sherman's advance, and Sherman estimated that he had 37,000 men for the purpose. Apprehending that Johnston would seek an opportunity to strike him on the last stage of the march, Sherman ordered Slocum on the left, to send his trains under a strong guard by an interior road on his right, and to keep at least four divisions with their artillery on the left well in hand, to meet an attack. Under this order Geary's and Baird's divisions were detailed to guard the trains. Slocum, preceded by Kilpatrick's cavalry, advanced on the direct road to Aversboro, to make a feint on Raleigh, and Kilpatrick was then to strike the railroad near Smithfield. Sherman says he "proposed to drive Hardee well beyond Aversboro and then turn to the right by Bentonville for Goldsboro." On the 15th Hardee was retiring from before Slocum, having for his rear-guard a brigade composed of artillery troops, that had garrisoned Charleston, under command of Col. Alfred Rhett. During the evening Kilpatrick, in skirmishing with this

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rear-guard, near Taylor's Hole Creek, took some prisoners, among whom was Col. Rhett.

Battle of Averasboro.—On the morning of the 16th opposition to the march was quite stubborn, and Kilpatrick, forcing back the Confederate rear-guard, came upon a line of intrenchments, on a narrow neck of swampy land, between Cape Fear and South rivers, and covering the road to Bentonville, along which Sherman intended that Slocum's wing should march to Goldsboro. Kilpatrick's cavalry was moved to the right and Jackson's and Ward's divisions of Williams' Twentieth corps were deployed in front of the Confederate line, and the two divisions of the Fourteenth corps ordered up on Williams' left. Case's brigade was sent by Williams to the left to gain the flank and rear of the Confederate line, and succeeded in striking it in flank and sweeping it from position, capturing McBeth's Charleston battery of three guns and 217 of Rhett's artillery acting as infantry. Jackson's and Ward's divisions advanced and came upon the Confederates in another line of works about 400 yards in rear of the first. Kilpatrick was sent to the right to seize the Bentonville road, but his leading brigade was driven back by a furious attack of McLaw's division, upon which the Union infantry advanced directly against Hardee, who also was advancing, and drove him inside his works, and Slocum went into bivouac in his immediate front. During the night, which was stormy and very dark, Hardee retreated, leaving 108 dead and 68 wounded on the field. His entire loss, as estimated, was about 650, of whom 175 were captured. Slocum's loss was 77 killed and 477 wounded. Next morning Ward's division pursued Hardee a short distance beyond Averasboro and ascertained that he had retreated toward Smithfield.

Sherman was now under the delusion that no serious opposition would be made to his march on Goldsboro. "All signs," he says, "induced me to believe that the enemy would make no further opposition to our progress, and would not attempt to strike us in flank, while in motion." Under this impression his commanders were instructed to march their troops in the easiest manner and by the nearest roads to Goldsboro. The left wing marched from Averasboro, on the direct road and on the night of the 18th, after driving back Hampton's cavalry to a position selected by Hampton for a battle, the Fourteenth corps in advance, encamped 25 miles from Goldsboro and five from Bentonville, at a point where the road from Clinton to Smithfield crossed the one to Goldsboro. Two divisions of the Twentieth corps were camped 10 or 12 miles in rear, while Geary's and Baird's divisions were on other roads, with the trains still farther to the south. Howard's two corps were to the south and east, their advance at Lee's Store, more than a day's march distant. Sherman had been with Slocum and the left wing since the 14th and very early on the morning of the 19th started to join Howard, several miles to the east and south, to concentrate his forces and unite with Slocum at Goldsboro, where he expected to meet Schofield and Terry. He had no suspicion that Gen. Johnston, with a strong force was then in Slocum's immediate front, and supposed that the only opposition to be met would be from cavalry. When about to leave Slocum he expressed the opinion

that Hardee had fallen back to Raleigh and that Slocum could reach Neuse River the next day, in which opinion Slocum concurred. But Gen. Carlin, commanding a division of the Fourteenth corps, and who was nearest the enemy, had observed matters that indicated a large force in front prepared for battle, and sought to impress his own convictions upon Sherman, who made light of them, said nothing but cavalry was in front, and rode away to join Howard.

On 23 February Gen. J. E. Johnston had been assigned to the command of all the forces that could be collected to make head against Sherman. At this time Hardee was moving toward Fayetteville, N. C.; Beauregard was directing the march of C. L. Stevenson from Winnsboro to Charlotte; Cheatham, with his division of Hood's army, had come from Augusta, Georgia, and was moving toward Charlotte, but on the west side of the Congaree and Broad rivers, and A. P. Stewart, with about 1,000 men of Hood's army, was marching for Charlotte. Johnston's first task was to concentrate these troops, which was done at Smithfield, N. C., where he was joined by Hoke's division from Lee's army at Richmond, which had unsuccessfully engaged Gen. Cox, near Goldsboro (see KINSTON, BATTLE OF), and also by S. D. Lee, with about 3,000 men of Hood's army. In all Johnston had about 20,000 men. He had as subordinate commanders Gens. Bragg, Hardee, A. P. Stewart, S. D. Lee, Wade Hampton, and others of high rank, who had long been the pride and ornaments of the Confederate armies.

Battle of Bentonville.—On the 17th Gen. Johnston had become satisfied that Sherman was not marching on Raleigh. He heard on the morning of the 18th that Sherman was marching on Goldsboro, and was informed by Wade Hampton that the Fourteenth corps was in his immediate front, that the Twentieth corps was several miles in rear on the same road, while Howard's two corps were on roads some miles to the south, and he determined to crush the Fourteenth corps before the Twentieth could come to its support, and then fall upon the Twentieth. He ordered Hampton to hold Slocum's head of column in check until he could march from Smithfield, 16 miles distant, and join him to give battle on ground that Hampton had selected, and to which he was forced back that evening, which was at a point about three miles south of Bentonville. In order to attack the head of Slocum's column early next morning, Johnston immediately marched his army from Smithfield, intending to bivouac that night between Bentonville and the road on which Slocum was moving. But the distance was greater than expected, the roads bad, and but a small part of the column reached Bentonville that night, the main column bivouacking some distance in rear. As soon as Hardee's troops reached Bentonville next morning they were marched by the left flank, Hoke's division leading, to the ground selected by Hampton, on the eastern edge of an old plantation, extending 1½ miles to the west and lying principally on the north side of the road, and surrounded east, south, and north, by dense thickets of black-jack. As there was but one narrow road through the thicket, the deployment of the troops consumed a weary time. Hoke's division was formed with its centre on the road, its line at right angles to it, on the eastern edge of the plantation, and its left ex-

SAVART'S WHEEL

tending some 400 yards into the thicket to the south. Two batteries, the only artillery, were on his right, commanding the ground in front to the extent of the range of the guns. The troops belonging to the Army of Tennessee were formed on the right of the artillery, their right strongly thrown forward, conforming to the edge of the open ground. Meanwhile, and before these dispositions had been completed, the battle had opened. Very early in the morning Hampton had thrown forward his cavalry, and when Carlin's division of the Fourteenth corps began its march at 6 o'clock it became almost immediately engaged with the Confederate cavalry, which offered such a stubborn resistance that Carlin deployed his entire division and brought up his artillery, and one brigade was sent to the left to develop the Confederate line, and as the resistance increased Morgan's division was moved to Carlin's right as a support, and the entire line was ordered to go forward, and was soon severely engaged, convincing Slocum that he had something more than cavalry in his front, of which fact he was soon further convinced by a deserter from the Confederates, who informed him that Johnston was in his immediate front, and that the talk in the Confederate camp was that Slocum was to be crushed.

Slocum prepared for defense by throwing up works, ordered Williams, commanding the Twentieth corps, to throw his train to the right and hasten up, and sent a messenger to Sherman with the information that Johnston's army was in his front. Carlin's division in advancing struck Hoke's division and, after some severe fighting, was repulsed, upon which Johnston ordered Hardee to charge with the right wing, Stewart's Army of Tennessee troops, and Taliaferro's division, and Gen. Bragg to join in the movement with his brigades successively, from right to left, each making the necessary change of front to the left in advancing. Hardee led his men forward and drove Carlin back just as the advance of the Twentieth corps came up, one brigade of which was sent to Carlin's support, and was driven back with him and another put in the gap between Carlin and Morgan just as the Confederates reached the line, the remainder of the corps forming on Carlin's left. The Confederates had become somewhat broken up in advancing through the woods, and when they received a telling fire from behind the slight intrenchments that had hurriedly been thrown up they fell back. On the right Morgan's division of the Fourteenth corps, with its supports, held its ground against Bragg's persistent attacks. The Confederate assaults were repeated several times until a late hour, each assault finding the Union line better prepared to receive it. Johnston had given the Fourteenth corps a heavy blow, but had failed to crush it, and determined not to renew the attack, but only to hold the ground until his wounded could be removed. The battle of the 19th was fought by about 16,000 men of the Fourteenth and Twentieth corps on one side, and about the same number of Confederates on the other.

When Capt. Joseph B. Foraker delivered to Sherman the message from Slocum that he had run up against Johnston's whole army, Sherman was incredulous, but he sent word to Slocum to hold on, ordered the Fifteenth corps, which was well to the rear, to turn at once toward Benton-

ville, and the Seventeenth corps to move in the same direction. Hazen's division of the Fifteenth corps reported to Slocum during the night, and was placed on the right. Early in the morning of the 20th Geary and Baird, each with two brigades, arrived on the field. Baird was placed in front of the works, and moved out beyond the advanced position held on the preceding day. The day was spent in strengthening the position and developing the line of the enemy, which brought on sharp skirmishing. The right wing under Howard came up late in the afternoon of the 20th and on the morning of the 21st. It had marched 20 miles over bad roads, skirmishing a great part of the way with the Confederate cavalry. There was heavy skirmishing during the day, but no general attack, and during the night Johnston retreated, crossing Mill Creek by the bridge at Bentonville and bivouacking on the night of the 22d near Smithfield. The Union loss in the battle was 191 killed, 1,168 wounded, and 287 missing, an aggregate of 1,643. The Confederate loss was 239 killed, 1,694 wounded, and 673 missing, an aggregate of 2,606.

On the 22d Sherman resumed his march on Goldsboro and on the 23d and 24th his entire army was assembled around the place and junction made with Schofield's and Terry's forces, which had occupied it two days before. (See GOLDSBORO, KINSTON, etc.) "Thus," writes Sherman, "was concluded one of the longest and most important marches ever made by an organized army in a civilized country. . . . The country generally was in a state of nature, with innumerable swamps, with simply mud roads, nearly every mile of which had to be corduroyed. In our route we had captured Columbia, Cheraw, and Fayetteville, important cities and depots of supplies, had compelled the evacuation of Charleston City and Harbor, had utterly broken up all the railroads of South Carolina, and had consumed a vast amount of food and forage, essential to the enemy for the support of his own armies. We had in mid-winter accomplished the whole journey of 425 miles in 50 days, . . . and had reached Goldsboro with the army in superb order, and the trains almost as fresh as when we had started from Atlanta." Consult: 'Official Records,' Vol. XLVII.; Van Horne, 'History of the Army of the Cumberland,' Vol. II.; Sherman, 'Memoirs,' Vol. II.; Johnston, 'Narrative'; The Century Company's 'Battles and Leaders of the Civil War,' Vol. IV.

E. A. CARMAN.

Savart's Wheel, an instrument for determining the number of vibrations which produce any given musical note. A toothed wheel, furnished with a counter to indicate the number of revolutions, is supported on a frame, and arranged to be driven by a band at high velocities from a rather heavy fly-wheel, and a card is fixed on a frame so as to be struck by the teeth of the toothed wheel. If the wheel be turned slowly a click is heard from the card as each tooth strikes it; on increasing the speed the separate clicks are no longer heard, but a musical note is sounded, which rises in pitch as the velocity is increased. If a large ring having teeth on the inside be fixed, and if the card be made to sweep round against these teeth, a note will be produced depending on the velocity of the card; but if the ear of the experimenter be

placed in an extension of the plane of the ring the note will not be constant, for it will be heightened as the card approaches him, and it will be flattened as the card recedes from him. The note will only be constant when the ear of the experimenter is at a point equidistant from all the teeth of the ring.

Savary, sã-vã-rê, Anne-Jean-Marie-René, DUKE OF ROVIGO, French general: b. Marçq, department of Ardennes, 26 April 1774; d. Paris 2 June 1833. In 1789 he entered an infantry regiment. He served under Custine, Moreau, and Desaix, and accompanied the last named on the expedition to Egypt. After the battle of Marengo he was appointed adjutant to Bonaparte, and soon rose very high in his confidence. His share in the execution of the Duke d'Enghien has never been properly explained, and is one of the darkest spots in his character. After rising to the rank of lieutenant-general he was rewarded, after the victory of Friedland, with the title of Duke of Rovigo. In 1808 the emperor sent him to Madrid, where he negotiated the arrangement by which the Spanish king and his son were kidnapped. In 1810 he succeeded Fouché as minister of police. On Bonaparte's return from Elba he gave in his adhesion to him, and was appointed inspector-general of gendarmes. He was carried to Malta in 1815, but escaped after being a prisoner for seven months. While here he began his 'Memoirs.' Later he stood trial at Paris as one who had contributed to Napoleon's return, but was acquitted. In 1831-3 he was military commander of Algiers.

Savastana. See GRASSES IN THE UNITED STATES.

Save, sãv, or Sau, sow, Austria, a river tributary to the Danube, formed near Radmannsdorf from the waters of the Wurzen and Wochlein Save which have their source in the eastern slope of the Julian Alps, and flow southeast through Illyria, along the southern part of Styria, into Croatia. At the frontier it becomes exceedingly tortuous, and finally flows through the Wocheiner See. The fall is rapid until the Leibach is received, and then the river becomes navigable, flowing through a narrow valley enclosed by mountains; it follows a circuitous route for about 540 miles and joins at Belgrade the Danube. Its main tributaries are all on the right—the Kulpa, Unna, Verbas, Bosna and Dvina. In the lower part, forming the boundary between Austria and Servia, it flows through flat plains, often devastating them by inundation. It forms an important outlet for the produce of the districts which it traverses.

Savery, Thomas, English engineer: b. Shilstone, near Modbury, Devonshire, about 1650; d. London May 1715. He became a military engineer, and rose to be captain in 1702. He is known for his inventions, most important of which was a machine for raising water from mines, which was the first practical application of steam-power to a mechanical purpose. A patent granted him in 1698 extended until 1733.

Savie, Eugene Coleman, American physician and author: b. Maryland 21 Oct. 1863. He was graduated from the University of France in 1888, from that of New York in 1889. He was for a time editor of the 'Expressman' and is

now attending gynecologist at Saint Mark's Hospital, New York. He has written: 'Wallingford' (1882); 'Life and Times of Brewster' (1891); 'The American in Paris' (1895); etc.

Savigny, sã-vên-yê, Friedrich Karl von, German jurist: b. Frankfort-on-the-Main 21 Feb. 1779; d. Berlin 25 Oct. 1861. He studied chiefly at Marburg, became a lecturer there in 1800, and in 1803 professor of jurisprudence. In 1808 he was made professor of law in the University of Landshut, in Bavaria, and in 1810 obtained the chair of jurisprudence in the newly established University of Berlin, where he continued to lecture with uninterrupted success for 32 years. He was elected a member of the Prussian Academy of Science, in 1811, was appointed a councillor of state in 1817, and in 1842 minister of justice for the revision of the law. He retired in 1848. His principal works are: 'Geschichte des römischen Rechts im Mittelalter' (1815-31); 'System des heutigen römischen Rechts' (1840-8), to which 'Das Obligationenrecht' (1851-3) forms an appendix; 'Vermischte Schriften' (1850), a collection of essays which had appeared in legal periodicals. He brilliantly applied the historical method to the exposition of the Roman law. Consult the biographies by Bethmann-Hollweg (1867) and Enneceerus (1879).

Savile, sãv'ıl, or Saville, George, MARQUIS OF HALIFAX, English statesman and writer: b. Thornhill, Yorkshire, 11 Nov. 1633; d. London 5 April 1695. On the death of Cromwell he distinguished himself by his exertions in behalf of Charles II. In 1669 he was appointed a commissioner of trade, in 1672 became a member of the privy council, and in 1682 was created Marquis of Halifax and lord privy seal. Under James II. he was made president of the council, but was deposed because he opposed the repeal of the Test and Habeas Corpus Acts. From this time Lord Halifax continued in opposition, and contributed to the elevation of William III. to the throne. He was the author of 'Advice to a Daughter' (1668), and of a variety of political tracts, the principal of which are: 'Maxims of State'; 'The Character of a Trimmer'; 'Character of King Charles II.'; 'Anatomy of an Equivalent'; 'Letter to a Dissenter.'

Savile, Sir Henry, English scholar: b. Bradley, near Halifax, Yorkshire, 30 Nov. 1549; d. Eton 19 Feb. 1622. He was educated at Oxford, became tutor in Greek to Queen Elizabeth, and in 1585 was made warden of Merton College and provost of Eton in 1596. He was knighted by James I. in 1604. In 1619 he founded two professorships in geometry and astronomy at Oxford, besides conferring several other valuable benefactions, both in property and books. Among his works the principal are his 'Commentaries on Roman Warfare' (1591); 'Rerum Anglicarum post Bedam Scriptores' (1596); 'Prælectiones tresdecim in principium elementorum Euclidis' (1621); and his edition of the writings of Saint Chrysostom (1610-13), in eight folio volumes, a work on which he is said to have spent £8,000.

Sav'in, or Sabin. See JUNIPER.

Savings Bank. See BANKS AND BANKING.

Saviour, Order of the. See BRIGITTINES; ORDERS, RELIGIOUS.

SAVONA — SAVONAROLA

Savona, sā-vō'nā, Italy, in the province of Genoa on the west coast of the Riviera, 26 miles southwest of Genoa, is one of the most important towns of that region. It is picturesquely situated amid vine-clad hills and orange groves. The Castle of Saint George (1542) is now a military prison; the other buildings deserving notice are a Renaissance cathedral, with the magnificent tomb erected by Sixtus IV. to his parents; the Della Rovere Palace, now occupied by municipal offices; other churches, a lyceum, a technical and a commercial institute, other educational institutions, a fine theatre, and a large hospital. It is a centre of the iron industry, having foundries of all kinds, besides glass-works and sulphur mills. It is an important seaport and its chief imports are coal, petroleum, iron, cereals, etc.; the exports consist of tomatoes, wood, and candied fruits. The harbor, which is good, is defended by a fort.

Savonarola, Girolamo, jê-rō'lā-mō sā-vō-nā-rō'lā, Italian religious reformer: b. Ferrara, Italy, 21 Sept. 1452; d. Florence 23 May 1498. As a boy he was well acquainted with mediæval learning and his family intended that he should become a physician, but a disappointment in love turned his thoughts to the church, and in 1475 he left home secretly and joined the Dominican order. After passing a severe novitiate in the monastery at Bologna he was made a teacher there, and in 1482 was sent to Saint Mark's monastery in Florence where he became disgusted at the corruption in church and state, and began to attack the abuses in his sermons. His first success as a preacher was at Brescia in 1484-5. He fascinated the worldly Italians by his terrible denunciations of vice and wickedness, and returned to Florence with a reputation as a popular preacher. In 1490 he was made *lector* in Saint Mark's, and crowds came to hear him. A year later he was chosen prior of Saint Mark. Though his convent had been favored by Lorenzo di Medici, Savonarola refused to do homage to him, as was customary. Lorenzo tried in vain to conciliate the friar who continually preached against the abuses in state and church. In 1492, Lorenzo di Medici, the chief opponent to the work of Savonarola in Florence, died. In the political confusion that followed, and during the invasion of Italy by Charles VIII. of France, Savonarola by his public services acquired great influence among the Florentines. He desired a democratic government for Florence, and, when in 1494 the people drove out the Medici, he opposed the schemes of the aristocracy to seize the government, called a mass-meeting of the citizens and practically assumed the dictatorship of Florence, superintending the formation of a government in which the people were to fear God and amend their conduct, and prefer public to private interests. A general amnesty was proclaimed, and a council modeled on that of Venice was chosen to administer the government. There was no doge as in Venice, but for three years Savonarola was dictator. His enthusiasm for liberty, his zeal in religion, and his eloquent sermons, caused light-hearted pleasure-loving Florence to become a city of Puritans. Thomas Aquinas and the Old Testament furnished the spirit of the laws. Though not of the Renaissance and hostile to its spirit, especially to the pagan influence derived from the

classics, Savonarola was not an enemy to learning and fine arts, though in 1497 he encouraged committees of children and devotees to search the city for frivolous books, cards, profane songs and music, and works of art of evil tendencies, which were destroyed under the direction of the government. No good books or works of art were destroyed at this time, though the next year many were lost in a second "burning of the vanities." Savonarola aimed at reforming the Church in the same caustic way. With his moral reforms he closely knitted political schemes and doctrines, and several times preached vigorously against Pope Alexander VI., who first tried to conciliate him. Savonarola spurned his advances, and in 1496 was ordered to cease preaching, and to undergo a trial for heresy. Silent for a time, Savonarola was attacked by the Franciscans and began again to preach. In 1497 he was excommunicated and Florence was threatened with an interdict if she harbored him. For a year he defied excommunication and demanded that a general council be called to depose Pope Alexander. But he had presumed too much upon the support of the fickle citizens. Many were weary of the Puritan rule and longed again for the flesh pots of Egypt; the other cities of Italy were hostile to Florence because of her course during the French invasion and because of her democratic government; there had been famine and pestilence, which Savonarola had been unable to alleviate; some of the followers of the Medici had been executed and thus powerful enemies made; and now Florence was threatened with an interdict. Savonarola had to be guarded by armed followers when he went to preach. In 1498, while still powerful, he in a sermon had called upon Heaven to consume him with fire if he had acted from unchristian motives. A friar of the Franciscan order thereupon offered to pass through the ordeal of fire with Savonarola, who treated the offer with contempt. But the Dominicans volunteered to undergo the ordeal to show their faith in Savonarola, and after hesitation, which his enemies made the most of, Savonarola consented to the judgment by ordeal, believing in Divine intervention in his favor. The fires were made ready and the opposing champions seemed ready to enter the flames, when the Franciscans, who had no intention of carrying out the judgment by ordeal, began to raise disputes to cause delay. They insisted that the Dominicans must not bear the crucifix nor the host through the flames. Savonarola would not agree to give up the latter and the dispute lasted until a rain came and gave the Franciscans an opportunity to slink away. But upon Savonarola was blamed the failure of the ordeal. The populace was infuriated because they had missed the show, and called Savonarola an impostor who was afraid of the ordeal. Florence turned against him; he was arrested, accused of heresy and after six days' torture and a hasty and unfair trial, was condemned to be hanged and then burned. The sentence was carried out with all the refinements of cruelty. Savonarola was a powerful, typical mediævalist, hostile to many of the manifestations of the Renaissance spirit. His talent for political organization was profound, but he was mistaken in thinking the Florentines capable of self-control in politics or of puritanism in religion. The Italian despots

understood the people better than Savonarola, and only as a despotic leader was Savonarola himself to any degree successful. His ideals were those of an ascetic, uncompromising, rigid. An eloquent speaker, he, for a time, imposed his ideals upon the Florentines, who when weary of being good, left him to his enemies. Of a mystical turn of mind, he attached great importance to dreams and visions which he related in his sermons. The writings of Savonarola were voluminous, embracing sermons, essays and poems on religious subjects, and a treatise on the government of Florence. Consult: Madden, 'Life of Savonarola' (1853); Villari, 'Life and Times of Girolamo Savonarola,' 2 vols. (1889); Symonds, 'The Age of the Despots' (1875); also George Eliot's 'Romola' (1863), and Alfred Austin's drama 'Savonarola' (1881); O'Neil, 'Jerome Savonarola' (1898); Lucas, 'Life of Savonarola' (1899).

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Savou, sā-voo', **Savoe**, or **Saboe**, an island of the Asiatic Archipelago in the Indian Ocean, near the islands of Timor and Sandalwood. It covers an area of 237 square miles. The surface is elevated in the centre, sloping seaward. It is well-watered and fertile, yielding millet, corn, beans; tropical products as usual in this latitude, including betel, cinnamon, mangoes, cotton, tobacco, etc. Domestic animals are numerous, besides buffalo, wild boars and deer. Horses and tobacco are the chief exports, sent to Timor. The island consists of five principalities, subject to the Dutch government of Timor. The inhabitants are Malays—a strong race with pagan practices, including dog sacrifices. Pop. 16,000.

Savoy, sa-voi', **House of**. The territory of Savoy formed part of ancient Gaul, and from 122 B.C. to 407 A.D. was in possession of the Romans, by whom it was divided into two provinces, the Graian and Pennine Alps. At the latter date it was seized by the Burgundians, but with Burgundy it became subject to the Franks in 534, was included in the Carolingian empire, and on its dissolution in 887 was granted by the Diet of Tribur to Rudolph, king of Transjuran Burgundy, and with that kingdom was united to Cisjuran Burgundy or Arles. On the accession of the last king of Arles to the imperial throne as Conrad II. in 1027, the more powerful nobles of northwestern Italy, such as the Marquis of Susa, the Counts of Maurienne, Turin, and Chablais, became vassals direct of the emperor. Umberto Blancamano, Count of Maurienne, was the first of the family who took a prominent place among the princes of northern Italy. His nephew, Amadeus II. (1060-80), in right of his mother, Adelaide, heiress to the Marquisate of Susa, added nearly the whole of Piedmont to the original possessions of his house. Humbert II., his son and successor (1080-1103), further increased his dominions by the conquest of Tarantasia. Amadeus III. (1103-49) received from the Emperor Henry V. the title of Count of Savoy in 1111; and his grandson, Thomas I., (1188-1233), who supported Frederick II. in his contest with the popes, obtained important accessions in Chambéry, Turin, Vaud, and other lordships. Amadeus IV. (1233-53), like his father a warm adherent of the emperor, obtained the submission of the city of Turin to his rule, and ceded Pied-

mont to one of his brothers, Thomas, count of Maurienne. He was succeeded by Boniface (1253-63), and Boniface by his uncle, Peter (1263-8), who reconquered Turin, which had rebelled. His nephew Amadeus V. (1285-1323) now mounted the throne; he assisted Philip the Fair in his war against Flanders, and accompanied the emperor Henry VII. to Italy. His grandson Amadeus VI. aided the Greek emperor, John Palæologus, against the Turks and the Bulgarians, and accompanied the pretender Louis of Anjou, in his expedition to Naples. His son, Amadeus VII. (1383-91), forced the Count of Provence to cede to him Nice and Vintimiglia. Amadeus VIII., grandson of the preceding (1391-1451), received the ducal title from the Emperor Sigismund in 1416, acquired the county of Geneva, together with Bugey and Vercelli, and re-annexed Piedmont. Louis, who on the abdication of his father had governed as regent, assumed the title of duke in 1440. The elder male line becoming extinct in 1496, the crown devolved on the nearest collateral heirs, Philibert II. (1496-1504) and his brother Charles III. (1504-53). The latter aided the Emperor Charles V. against Francis I. of France, and after losing Valais and Geneva, which joined the Swiss Confederation in 1533, and the canton of Vaud, seized by the Bernese in 1536, he was finally deprived of all his territories by the French king. But his son Philibert Emmanuel, surnamed the Iron Head (1553-80), commander-in-chief of the Spanish army, succeeded in gaining back the greater part of the paternal domains by the treaties of Câteau-Cambrésis (1559) and Lausanne (1564). In 1560 he was induced by the courts of Rome, Spain, and France to attempt the conversion of the Waldensers by force, but they offered such vigorous resistance to his troops in several encounters that he granted them, under certain conditions, the free exercise of their religion (5 June 1561). Charles Emmanuel I. (1580-1630) was defeated by Henry IV. of France, who invaded Savoy and Piedmont. His son, Victor Amadeus I., speedily regained the possessions his father had lost, and added to them Montferrat, Alba, and some other places, surrendering to France in exchange Pignerol, La Perouse, Angrone, and Lucerne. His younger brother Thomas was the founder of the line of Savoy-Carignan. Victor Amadeus II. (1675-1730), grandson of the first of that name, at the beginning of the war of the Spanish Succession, sided with France; but, bribed by brilliant offers, allied himself to Austria by the Treaty of Turin, 25 Oct. 1703. The victories of the Duke of Vendôme compelled him to retire to Genoa, but the defeat of the French under the walls of Turin by Prince Eugene (7 Sept. 1706) restored his possessions. In 1709 he severed the Austrian alliance, and remained neutral till the end of the war. By the Treaty of Utrecht (1713) he received a part of the Duchy of Milan, with the island of Sicily, which conferred upon him the title of king. In 1720 he was compelled to give up Sicily to Austria in exchange for Sardinia, which with Savoy, Piedmont, and his other continental dominions, were erected into the Kingdom of Sardinia. Consult: Wiel: 'The Romance of the House of Savoy' (1901).

Savoy, or **Savoie**, sā-vwā, France, consists of two eastern departments, Savoie and Haute-Savoie, formed in 1860 out of the former duchy

SAVOY CABBAGE — SAVOY DECLARATION

of Savoy, one of the states of the Sardinian monarchy (q.v.); it covered an area of 3,891 square miles, and is exceedingly mountainous. The region is separated from Switzerland by Lake Geneva, and is dominated by Mont Blanc, the loftiest peak of the Alpine chain, whose many ramifications extending in all directions present a relief of successive mountains and valleys. Savoy belongs to the Rhone basin which forms its western boundary. The other rivers are the Arve, Isère and Arc. The chief lakes besides Geneva are those of Bourget and Annecy. The climate is, generally speaking, cold. Savoy is rich in mineral waters, of which the most famous are those of Aix-les-Bains (hot-sulphur), Marlioz, Challes (strong natural sulphur), Salins-Montiers (hot, saline, various minerals), Brides-les-Bains (soda, calcium). The extent of arable ground is limited, but a scarcity of grain is supplied by the chestnut which forms a staple of food among the peasants and poor. The vine is somewhat cultivated in the lower valleys and slopes. The main source of profit is in the cattle and dairy produce, as hay and pasture alone are obtained from much of the land. The forests which cover vast mountain slopes, also afford a rich supply of timber. The minerals are not sufficiently exploited to be of any importance. The manufactures are coarse woollens, linen and cotton goods, felt hats, leather and hardware. Other industries are silk, tanning and weaving. There is an important transit trade carried on between France and Italy, by way of Mont Cenis. Coal, skins, cotton, provisions, are imported; cattle, dairy produce, wood, stones, mineral waters, silk goods, tanned leather and paper are exported. There are some schools, and all speak French and are exclusively Roman Catholic. The University Academy is at Chambéry, and clock-making is taught in two special schools at Annecy, employing 2,000 hands. (Here is also a large cotton mill.) The inhabitants are industrious, honest, hospitable and intelligent; their chief characteristic, however, is the love of country. Though often compelled to leave their homes for winter employment, wandering through France, Switzerland, Spain, or Italy, in order to earn a livelihood, they return to their native mountains at the earliest moment. Sardinia ceded Savoy to France in 1860. It was formed into the two departments of Savoie and Haute-Savoie, whose capitals are respectively, Chambéry and Annecy. Pop. Haute-Savoie about 263,000; of Savoie about 252,000; total, 515,000.

Savoy Cabbage, a variety of cabbage (q.v.) with many sub-varieties, forming large close heads with wrinkled leaves, and cultivated for winter use, requiring a light, rich soil.

Savoy Conference, a conference held in 1661 at the Savoy Palace, London, between a number of Church of England and Presbyterian divines for the purpose of "advising upon and reviewing the Book of Common Prayer; and of taking into serious consideration the several directions and rules, forms of prayer, and things in the same book; of consulting also upon the several objections which shall now be raised against the same; and, if occasion need be, to make such necessary and reasonable alterations, corrections, and amendments as shall be agreed upon to be needful and expedient for the giving

satisfaction to tender consciences, and the restoring and continuing of peace and unity in the churches under his majesty's government and protection." When the Parliamentary cause triumphed in the civil war of 1642-6 the majority of the clergy, who were royalists, were either turned out of their pulpits and their places were filled by Presbyterians, then a strong body in England, and at the Restoration of Charles II. a large number of the ministers connected with the church strongly objected to Episcopalian order and practice being again introduced. The government was fully aware of this state of matters, and it was accordingly resolved that the determination of all matters appertaining to the establishment of unity should be left to the advice of a national synod. On 25 March 1661, therefore, the letters-patent above quoted from were issued, appointing 12 bishops, with nine clergymen as assistants on the Episcopal side, to meet with an equal number of Presbyterian divines, and discuss the matters therein mentioned. The commissioners met for the first time on 13 April. Sheldon opened the discussion by observing that the Episcopal party, being perfectly satisfied with the established forms of worship, had nothing to propose, and would therefore expect that any objections to the existing order of things, and any innovations that might be desired, should be mentioned by their opponents. The Presbyterians moved that Bishop Usher's Reduction of Episcopacy, a scheme in which the elements of the Scotch system of presbyteries, synods, and general assemblies were combined with distinctions of ecclesiastical ranks, should be laid down as a groundwork to treat upon. They further offered several exceptions to the liturgy, against the many responses of the people, and desired that all might be made one continued prayer. They objected to lessons being taken out of the Apocrypha, and wished that the psalms used in the daily service should be according to the new translation. They excepted to many parts of the baptismal service that infer the doctrine of the regeneration of the baptized. They also moved that the practice of kneeling at the Lord's Supper, and that the use of the surplice, the cross in baptism, of godfathers as sponsors, and the celebration of the holy days, should be abolished. It was urged in reply to the demand for the adoption of Usher's scheme, that the king's commission gave them no power even to take into consideration any questions relating to the government of the church; and the Presbyterians proceeded to discuss the minor points, mainly the alterations in the liturgy. Baxter undertook the preparation of what was called a Reformed Liturgy, but the Episcopalian commissioners rejected it at once, without examining it. The two parties finally separated at the end of four months, the period assigned by the letters-patent, without coming to a single resolution, and the government passed in the following year the famous act of uniformity, the stringent clauses of which drove about 2,000 clergymen from the Anglican Church.

Savoy Declaration, the document uttered by the Independents and Presbyterians who met at the Savoy Hospital in London 29 Sept. 1658. In it these religionists declared the principles of their faith and polity. The Declaration is substantially the same as the Westminster Con-

SAVOY, MILITARY ORDER OF—SAW-MILL

fession. See **CONFESSION OF FAITH, WESTMINSTER.**

Savoy, Military Order of. See **ORDERS, ROYAL.**

Sa'vory, an aromatic plant of the labiate genus *Satureja*, native to the Mediterranean region and the Levant. These are herbaceous or half-shrubby plants, cultivated in kitchen gardens. Summer savory is the annual (*S. hortensis*), with slender branching stems nearly a foot high, bearing soft, lanceolate leaves, often stained with purple, and with lilac or white mint-like flowers in the axils. The young shoots are plucked at flowering time, and dried for flavoring stuffings, etc. Winter savory (*S. montana*) is a perennial species, with similar qualities.

Saw-fish, a ray of the family *Pristidae*, so called from the sword-like snout, the sides of which are armed with spines, so as to give it the appearance of a large double-toothed saw. Armed with this formidable weapon, which may measure two or three feet or more in length, the saw-fish is said to attack even whales, and to inflict severe injuries upon them, while it is certainly destructive to shoals of small fishes upon which the saw-fish subsists. The true teeth of the mouth are small, blunt, and arranged pavement-like. The mouth is situated on the under surface of the head, and the breathing apertures are large and set behind the eyes. The fins, tail, and granular scales are shark-like in most respects. About five species are known, all inhabitants of the open ocean, whence they seldom approach the shore; and they prefer warm waters. A common species on the Gulf coast of the United States is *Pristis pectinatus*, which sometimes enters the lower Mississippi or wanders northward on the Atlantic coast; it is 10 to 20 feet long. The *Pristisphoridae*, which bear a similar weapon, are sharks.

Saw-flies, insects of the family *Tenthredinidae*. Unlike the wasps, bees, ants, and other members of the order *Hymenoptera*, the abdomen is united by its full girth to the thorax; that is, it is sessile. The most characteristic structure, however, is the ovipositor, which is composed of several parallel blades with toothed edges. With these the insects cut slits in plant tissues for the reception of their eggs. In general they resemble other members of the order in having two pairs of transparent wings with rather few veins and cells, biting mouth-parts, and a complete metamorphosis. The larvæ resemble caterpillars, but have at least six pairs of prolegs instead of five as do the larvæ of lepidopterous insects. They are also frequently slimy, and quite often they keep part of their bodies curved over the edge of the leaf upon which they are feeding. All feed upon living vegetable tissue, and some have been considered troublesome upon cultivated plants. Probably the best known of these is the currant-worm or slug (*Nematus ribesii*), a European insect with a yellow body. The black-dotted green larvæ appear shortly after the leaves in spring, eat gluttonously for about three weeks and transform to adults below the ground. Two or three broods may appear in a season. The pear slug (*Eriocampa cerasi*) is a slimy larva which sometimes damages pear foliage. Rose slug,

grape slug, raspberry slug, turnip fly, and willow saw-fly are other well known species which occasionally seem to overstep the bounds of their usefulness. In such cases they have been combated with an insecticide (q.v.) which must be eaten, though in some cases dust, forcible spraying with water, and other remedies have been reported effective.

Saw-mill, an arrangement of machinery by which logs are converted into planks, boards and timber. The earliest form was the saw-pit with raised trestle horses onto which the log was raised, and then sawed by hand saws or by whip saws. Windmill power was applied about the beginning of the 13th century, and was soon followed, especially in Germany, by water power.

All attempts to establish saw-mills in England during the period of 1660-1770, were unsuccessful on account of the opposition of the hand sawyers; but in the United States, beginning with the erection of the mill at Piscataqua Falls in the State of Maine, in 1634, a vast number of mills have been built in all of the wooded districts of the country, and by the development of improved methods in handling the logs, and in arranging the machinery, have made such States as Maine, Michigan and Wisconsin famous as the greatest lumber producing areas of the world.

Of these mills, the earlier forms are known as gate or sash saw-mills, and consisted of two upright guide posts held in position by a transverse beam at the top. A heavy rectangular wooden frame carrying a straight band saw attached to the top and bottom pieces, worked with a vertical reciprocating motion in slides between the guide posts. The reciprocating motion was imparted to the sliding frame by a connecting rod, the lever end of which extended to one end of a water-wheel shaft. The carriage bearing the log was moved by a rack and pinion arrangement operated by a feed-wheel, and the log was fed endwise to the saw, which was run, usually, at a speed of 150 strokes per minute, and was capable of producing from 500 to 2,000 superficial feet of lumber per day of ten hours.

A larger output was obtained by introducing the "gang" feature, which consisted of attaching several saws to the sliding frame. In the "Yankee gang," the saws were arranged in two sets, with the tooth edges of one set facing in a direction opposite to that of the other set, and enabled the sawing of two logs at one movement of the carriage. Other forms, designated "slabbing gang," "stock gang," and "pony gang," applied the method to special purposes.

The "muley" saw followed the gate and gang saws, and was adopted generally by the smaller mills on account of the great reduction in the weight of the reciprocating parts. In this arrangement, the ends of the saw are attached to two light cross-heads opposite each other, which oscillate up and down. The saw is kept in line by means of slides working in a strong iron frame swung from an overhead beam. The cutting is accomplished entirely by the downward motion, during which the action of the slides causes the saw-teeth to hug close to the wood, and then recede from it during the upward motion, so as to reduce the friction. Muley saws

SAW-MILL

are driven at a speed of about 300 revolutions of the driving wheel, per minute, and are capable of turning out about 6,000 superficial feet per day.

Saw-mills employing circular saws are of comparatively recent date. The experimental point in the use of the circular saw as the main saw of a mill, was passed about the middle of the 19th century, since which time it has been developed to a state of very high efficiency and general usefulness. By its use a continuous cutting motion is obtained, and driven by engines ranging from 25 to 100 horse-power circular saws in connection with steam feeding arrangements are capable of sawing from 20,000 to 100,000 superficial feet per day, practically limited only by the capacity of the handlers to remove the lumber.

The saw, which is a disk of steel with a toothed edge, is mounted on a shaft which is rotated by gear wheels, or by belts operated by the shaft of a water wheel or a steam engine. The cutting depth of the saw is somewhat less than half the diameter of the disk, and the saws generally employed rarely exceed a maximum diameter of 6 feet, on account of the increased thickness required to obtain sufficient rigidity, and the consequent increase in the amount of the kerf or cut waste. Water power was used almost exclusively until 1835, but it has been almost completely supplanted by steam engines. "Band saws," although known a great many years before the circular saw, were not adopted until recent years on account of the difficulty experienced in making saws of sufficient endurance to withstand the severe service. During recent years, however, these difficulties have been overcome, and they are now generally used in all of the great lumber producing countries.

The mechanical arrangement consists of two broad-faced wheels mounted one above the other. Over these wheels, a continuous band of steel, which is the saw, works like a belt over two pulley wheels, with a continuous motion, and the logs are fed endwise against the cutting or toothed edge by a traveling carriage. Mills employing band saws are capable of producing from 40,000 to 80,000 superficial feet of lumber per day, and require from 25 to 45 per cent less driving power than mills employing circular saws.

A thoroughly modern saw-mill employs both circular and gang saws. The mill is usually built upon the banks of a river or pond, and the driving power is obtained from water wheels or from steam engines. The general construction is quite simple, and consists of a saw floor and log deck built at an elevation of about 10 or 12 feet above the water level. A jack ladder constructed of heavy timber with its lower end resting on the bottom of the stream, leads up to the saw floor at the rear end of the mill. Ribbons of iron are fastened to the top sides of the ladder and form the track upon which the log car is operated. The arrangement and installation of the saws vary according to the size of the mills and the kind of work performed. As previously stated, the sizes of the saws generally used are about 6 feet in diameter and the depth of cut is less than three feet, therefore, in mills handling logs of large diameter, increased depth of cut is obtained by mounting

two saws one above the other, so that they cut in the same line—the upper one cutting down from the top of the log to the cut of the lower or main saw. In the mills in California, logs measuring up to 10 feet in diameter, are sawn by arranging four saws one above the other, some cutting horizontally and others vertically, thus permitting the handling of large trees, which up to the present time were considered unavailable.

The gigantic trunks of the redwood trees of California, Washington and other States on the Pacific coast, ranging from 10 to 25 feet in diameter, are first quartered by explosions of gunpowder and then passed through the mills.

One great disadvantage in the use of circular saws is the excessive kerf waste, which is fully 20 per cent greater than that resulting from the use of the band or the gang saws, and is one of the principal reasons for the employment of the last named forms in the smaller mills where the uniform character of the lumber and the saving of raw material are important factors.

The majority of the American mills use single circular saws, but many of them have saws installed upon each side of the mill floor, and the logs are rolled to either side by the log jack placed in the centre of the building. In addition to these rotaries, the larger mills have from one to four gang saws.

The arrangements for handling the logs which are floated down upon the rivers from the distant forests to the mills, consist of piles driven at convenient distances apart, into the bed of the river adjacent to the mill, to which strong "booms," logs, are attached by heavy chains and serve to hold the logs as in a pen, until they are required, and also to leave a free channel in the middle of the stream. When the mill is in operation, the boomed logs are drawn from the water by an endless chain which runs in a V-shaped log slide, and is provided with spikes to prevent the log from slipping back. The logs follow each other in endless succession. When a log reaches the log deck, it is loaded upon the skids by the action of a lever operated by the sawyer, which causes a pair of arms to rise through the mill floor and raise the log forcibly onto the skids. The skids lead to the log carriage, upon the "head blocks" of which the log is securely fastened by the insertion of a "dog," and it is then ready to be advanced to the saw. This is accomplished in several different ways—by rack and pinion: worked by "cone feed," consisting of two parallel cones operating a belt which regulates the motion of the pinion shaft; by "rope feed," consisting of a wire rope which passes over pulleys set in the floor to a drum underneath, and is so arranged as to be under the control of the sawyer in the forward movement of feeding, or in the reverse movement of returning the carriage to its original position; or by "steam feed," commonly termed "lightning feed," derived from the force of a steam cylinder about 10 inches in diameter, which is laid upon the mill floor underneath the saw carriage to which the piston is attached. As the log is fed, and when the first slab has been removed, the sawyer touches a lever and brings the "nigger," a piece of iron-bound timber with spikes upon its front face, through the floor. The spiked

SAW-WHET OWL—SAWS AND SAWING

face catches the side of the log and turns it axially, at once, to any desired position. If the log is being "canted," or prepared for the gang saw, the slabs are removed from the two opposite sides, a hook is thrown over the rear end of the cant so as to prevent it from returning with the saw carriage, and it is dropped upon a set of rollers which starts it toward the gang. From the time that the log is drawn out of the water and until it emerges from the gang as a finished product, all of the operations are performed by machinery.

The finished product of saw-mills are planks, boards, and timber of varying sizes in length, breadth, and thickness, too numerous to enumerate specifically; laths, consisting of strips four feet in length, $\frac{3}{4}$ inch in thickness, and $1\frac{1}{2}$ inches in width, used for lath and plaster work; and shingles, thin, flat, tapering pieces of wood usually 4 inches wide, $\frac{3}{4}$ inch thick at one end and $\frac{1}{4}$ at the other, used for roofing purposes.

The annual output of individual mills depends upon their size and the arrangement of their machinery. Large mills in Maine, Michigan, and Wisconsin have records as high as forty million superficial feet per year. The one located at Basin Mills, Maine, is probably the largest mill under a single roof, in the world. The total production of the 31,833 saw-mills in operation in the United States, in 1900, was over thirty billion superficial feet, with a market value of about \$425,000,000. According to the United States census of 1900, these mills represent a total invested capital of \$205,785,236, and give employment to 229,710 workmen.

For technical description of saws see METAL-WORKING MACHINERY, and WOOD-WORKING MACHINERY.

W. MOREY, JR.,
Consulting Engineer.

Saw-whet Owl, a small American owl (*Nyctale acadica*), which takes its name from the rough tone of its cry. It is northerly in its distribution, ranging across the continent, but rarely dwelling as far north as Hudson Bay. It is not so large as a robin, and has inconspicuous ear-tufts; bill black; cere tumid; general color, above chocolate brown, streaked with white; below, white with brown stripes. Its food consists mainly of insects, and its nest is made in a hollow of a tree, in an old crow's nest or any convenient place. Compare SPAR-ROW-OWL.

Sawbill, a motmot (q.v.).

Sawdust, a general name given the accumulated particles caused by sawing wood, stone, etc. Besides the more common uses of sawdust, it is commercially valuable as the basis of various manufactures. Oxalic acid is manufactured on a large scale from wood sawdust. Sawdust is also used in the "carbonating" stage of the process for the manufacture of soda ash. The sawdust of mahogany and rosewood is used in dressing furs, and the small fragments of some woods, such as the pencil cedar, made by saw cuts or the turning tool, yield perfumes. Sawdust sinks in water, though the wood from which it is cut floats.

Saws and Sawing. A saw is a tool consisting of a thin, flat blade of highly tempered steel serrated or having a series of triangular shaped

teeth usually on one of the edges, but sometimes on both edges as in the case of some forms of pruning saws and in the plumbers' saws. It is one of the most important of the various forms of cutting tools, and is extensively used for working wood, metal, stone, and other substances, but principally wood.

Saws are made in a great variety of forms and sizes in order to adapt them to the varying characteristics of the material worked, and to suit them to the particular kind of work for which they are used, and also to suit the circumstances attending the manner in which they are operated or handled.

A general classification of the different kinds of saws according to their form, and the direction of their motion in the act of cutting, together with a comprehensive description of the methods of application, and the use of the various forms of power driven saws are given in the articles under the titles, TOOLS and WOOD-WORKING MACHINERY in this Encyclopædia.

In this article the consideration of the subject will be confined to the construction and

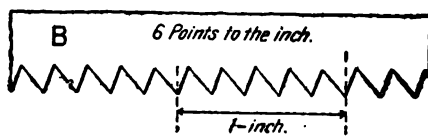
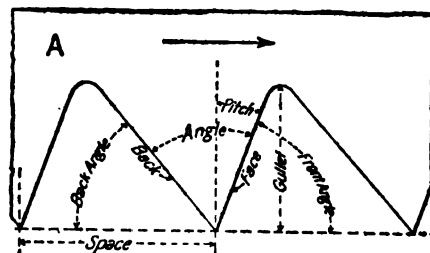


Fig. 1.

adaptation of the various makes of saws for specific purposes, and to the identification of their generally applied trade names with those purposes.

The characteristic action of the saw being the removal successively of minute portions of the material worked by the cutting or tearing action of a series of sharp edges thrust against the material indicates that it is essentially a tool adapted for cross-cutting or cutting at right angles to the fibre of the material. Necessity and custom, however, have compelled its application for ripping or cutting with the grain also, thus adapting it to work which otherwise would be accomplished by the use of cutting tools such as axes and chisels. These conditions define two primary classes of saws—the cross-cut saws and the rip saws which divide all the different kinds of saws into two groups according to the general purposes for which they are used.

Saw Terms.—The principal terms used in describing a saw are as follows: (See Fig. 1, Diag. A.)

SPACE.—The distance between two contiguous teeth, measured from point to point.

PITCH OR RAKE.—The inclination of the face of a tooth or the angle of the face of a tooth

SAWS AND SAWING

measured from a vertical line drawn through its point.

GULLET OR THROAT.—The depth of the tooth from the point to the root.

GAUGE.—The thickness of the blade, usually measured by the wire gauge.

SET.—The amount of lateral inclination

POINT.—The lower intersection of the back and the face.

GULLET.—The upper intersection of the back and the face. It is usually defined as a measurement as already indicated.

Saw teeth vary in spacing, length or depth of gullet, angle, pitch, set, fleam, and form of

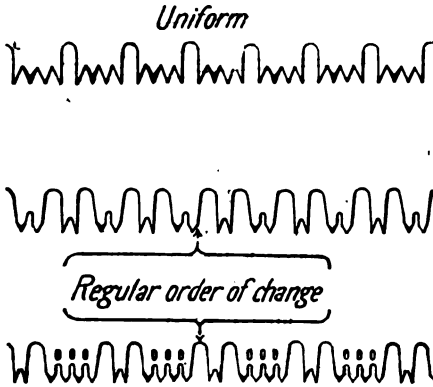


Fig. 2.

given to the teeth, either to the right or to the left of the plane of the blade, in order to produce a kerf or cut of sufficient width to effect a proper clearance of the saw dust, and to prevent the saw from binding or being pinched by the sides of the cut.

FLEAM.—The side angle of a tooth.

POINTS.—The number of teeth points to an inch. The coarseness and fineness of saws are

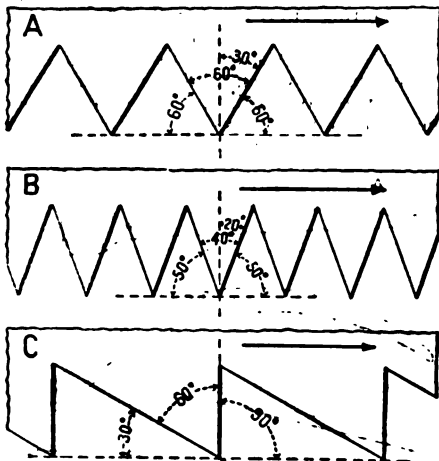


Fig. 3.

usually estimated by the number of points instead of the number of teeth to an inch, and it should be observed that there is always one less tooth per inch than there are points. (See Fig. 1, Diag. B.)

The several parts of a saw tooth are usually described by the following terms: (See Fig. 1, Diag. A.)

FACE.—The front or cutting edge of the tooth.

BACK.—The following or back edge of the tooth.

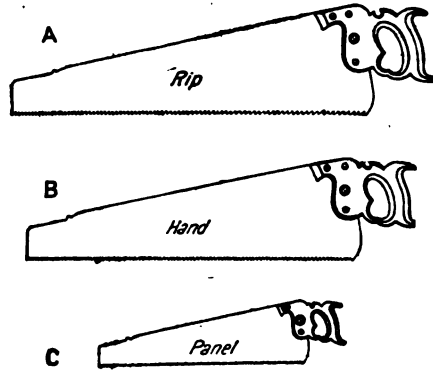


Fig. 4.

gullet. The teeth may be uniform throughout, or the blade may have several different kinds of teeth. In the latter case all the teeth of a kind are made uniform, or they are arranged in a regular order of change. (See Fig. 2.)

The "angle" of a saw tooth is that which is included in its point between the face and the back. The generic angle is 60° , but it varies in the different kinds of teeth from 45° to 70° .

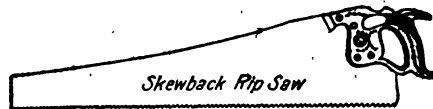


Fig. 5.

according to the character of the material worked, and the specific purpose for which the saw is used. The angle suitable for cutting soft wood and for ripping purposes is always more acute than that used for cutting hard wood and for cross-cutting. For soft wood, the front angle varies from 65° to 70° ; for hard wood from 80° to 85° . In saws employed for cutting very hard knotty wood, and in those used for

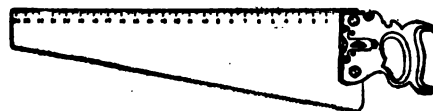


Fig. 6.

cutting metal, the teeth are arranged in a series of equilateral triangles, the pitch of each tooth being evenly divided between the front and the back. In saws used for a general line of work, the angle usually adopted is 40° , with the pitch evenly divided. In saws used for cutting soft woods and for ripping purposes, an effective placing of the angle is attained by making the face upright, and sloping the back. (See Fig. 3, Diags. A, B, C, respectively.) The pitch of a saw tooth is obtained by subtracting the back angle from the front angle. These terms, and

SAWS AND SAWING

rules apply generally to all the different kinds of saws from the smallest hand and machine saws used by jewelers, machinists, and carpenters, to the largest power-driven saws employed in the various classes of saw mills.

The various kinds of saws manufactured and used at the present time are of the following named general types:

The "rip" saw, the "hand" saw, and the "panel" saw. (See Fig. 4.)

The hand saw is usually made about 26

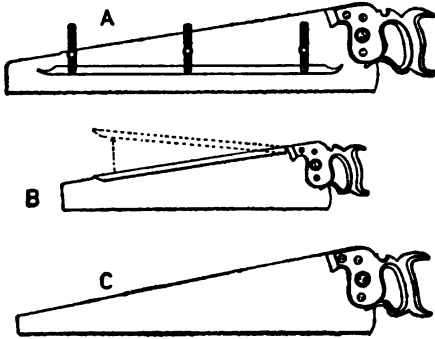


Fig. 7.

inches in length, and is used for the common work of sawing material of moderate thickness both longitudinally and cross-wise. The rip saw and the panel saw are modifications of the hand saw from which they differ in the size of the teeth, and in the length of the blade. The rip saws range from 28 to 36 inches in length, and the panel saws from 12 to 24 inches. The usual spacing of the teeth of the three types is as follows: Hand saws, 5 to 12 points per inch; rip saws, 3 to 5 points at the heel or handle end, and 6 to 8 points per inch at the point; and the panel saws, 8 to 12 points to the inch. All three forms are made with a straight upper edge, or a "skewback" curve as shown in Fig. 5.

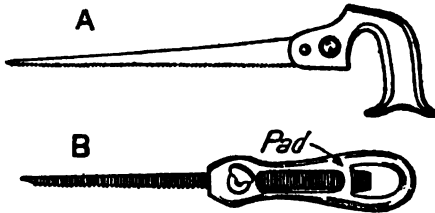


Fig. 8.

A novel and useful form is represented by the "combination" saws. These are graduated along the upper edge, and are furnished with a level attachment as shown in Diag. A, Fig. 6. As a tool of general usefulness they possess the additional advantages of a square, a 24-inch rule, a level, a plumb, a straight edge, and a scratch awl. Other useful modifications of the hand saw are the "gauge" saw, the "ship carpenter's" saw, and the "movable-back" saw, shown by Diags. A, B, C, respectively, of Fig. 7. The gauge saw is equipped with a movable attachment by means of which it may be adapted to tenoning, shouldering, curving, cog-cutting, or to any other purpose where a definite depth of cut is required. The movable-back saw combines the advantages of a thin bladed hand saw

and a first class back saw. The ship carpenter's saw has a very long narrow blade and is especially suitable for cutting sweeps or curves of long radius. It is handled like the rip saw, and is extensively used by cabinet-makers, pattern-makers, and others for work requiring a narrow saw.

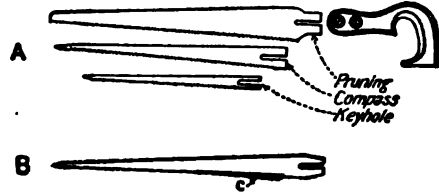


Fig. 9.

The "compass" saw and its modifications, the various form of "key hole" saws, which are also commonly known as "pad" saws and "socket" saws, are shown in Fig. 8, Diags. A and B, respectively. The blades of the compass saws range from 10 to 20 inches in length, and taper from one eighth inch at the point to two or more inches at the heel. They are used for cutting curves and sweeps by hand and are sometimes called "table" saws. The regular keyhole

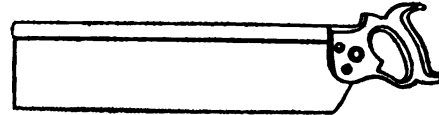


Fig. 10.

saw and its modification, the pad saw, are simply smaller forms of compass saws, and are used for cutting curves of small radius such as keyholes and other small holes in the central portions of work. A saw of this type consists of a narrow blade which slides into a hollow handle or pad, to which it is secured in place by one or more set screws, only so much of the blade being drawn out as may be required by

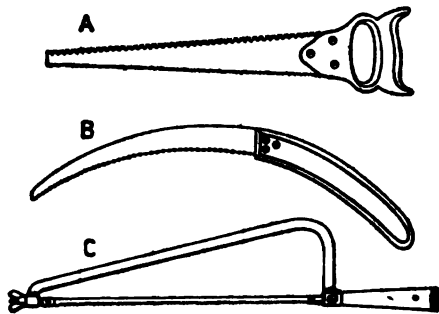


Fig. 11.

the character of the work. These saws are made both singly and in "nests." A nest of saws consists of a handle and three interchangeable blades, one each of the keyhole or pad, the compass, and the table or pruning saws. (See Fig. 9, Diag. A.) A very useful novelty in this line is the nest of saws designed for cutting square holes. In this combination, the keyhole and compass blades are fitted with an attachment at right angles to the plane of the blade as shown at (C) Diag. B, Fig. 9.

SAWS AND SAWING

The "back" saws are a class of hand saws characterized by deep thin blades stiffened with a metallic back as shown in Fig. 10. The principal forms are the "mitre box" saw, the "tenon" saw, the "sash" saw, and the "dovetail" saw. The last named has the thinnest blade, so thin, that simple filing gives the teeth sufficient set. The blades of the others are somewhat thicker and require a slight amount of set. All back saws are best used in a mitre box or in some

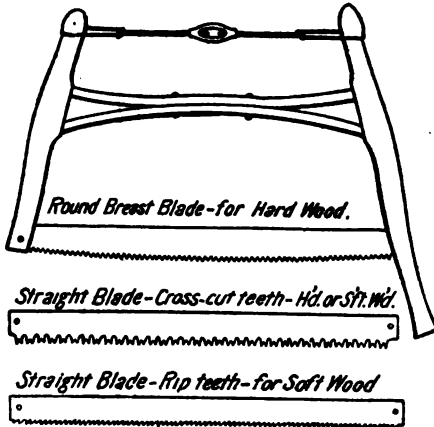


Fig. 12.

other form of guide rest. In cutting, they should be held firmly with the least practicable expenditure of force in controlling their direction, and the cut should be commenced by placing the heel of the blade on the farthest edge of the work and then drawing the saw steadily toward the body of the operator. Back saw blades range from 8 to 18 inches in length, the number of teeth varying in number from 10 to 14 per inch.

The "pruning" saws are of several kinds, the principal forms of which are shown in Fig. 11. They vary from a large form of compass saw to straight saws toothed on both edges as shown in Diag. A, and also to those with curved blades as shown in Diag. B, a form extensively used on

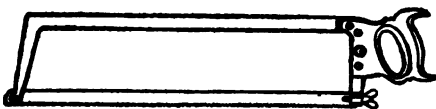


Fig. 13.

the Pacific Coast. They are also made of narrow blades attached to metal frames, the shape of which produce a tapered combination which permits of the use of the saw in very narrow spaces. See Fig. 11, Diag. C.

The construction of the tapered pruning saw places it on the dividing line between what may be termed the regular bladed saw and the frame saw. In the former, the pressure on the cutting edge is resisted by the rigidity of the blade itself, while in the latter, the pressure is resisted by the distribution of the tension of the blade through the various parts of the frame. Of the frame saws, the most familiar are the "wood" saws shown in Fig. 12, the "butchers" saws shown in Fig. 13, and the "hack" saws shown in Fig. 14. The last named is shown in its adjustable and extendable form, in which the

frame may be lengthened or shortened to fit blades of varying length. The saw has a thin, narrow blade and equilateral triangular shaped teeth. It is stretched between the upright portions of a wrought-iron or steel frame, the requisite tension being imparted by means of a thumb-screw at the forward end. A handle is attached to the back end of the frame, which is usually grasped by the right hand of the operator, and the downward pressure imparted to the tool during the act of cutting by laying the left hand upon the back or top of the frame. This saw is extensively used by fitters and me-

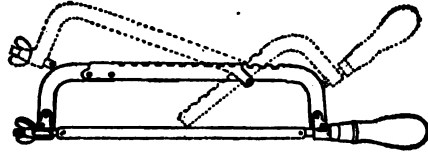


Fig. 14.

chanics for cutting odds and ends of metal, and has now become one of the most important tools in a machinist's toolbox. For general work, the blades are made with 14 teeth to the inch, but those used for cutting tubing and thin metal are usually made with a greater number of teeth, about 25 per inch, in order to prevent a free bite and to reduce the danger of stripping the teeth. As in the case of the file, the fineness of the bite depends upon the number of the teeth in contact with the work; therefore, the judgment of the operator usually determines the amount of pressure that should be applied to the saw to suit the varying conditions of the cut. As in the case of other cutting tools, experience teaches that a hack saw will work more effectively under a pressure sufficient to make the tool bite freely, than when it is allowed to scrape and glaze the surface under a light pressure. In order to use a hack saw properly, the blade should be strained in the frame to prevent its kinking, and the cutting strokes should be made uniformly at a rate not exceeding 40 per minute.

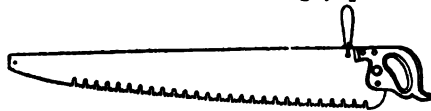


Fig. 15.

The blades should be as short as possible, so as to reduce the cost and the danger of breakage, and oil should *never* be used on the teeth as it decreases their cutting efficiency. The reverse is true in the case of wood-working saws. Hack saw blades as regularly manufactured range from 6 to 18 inches in length. Those longer than eight inches for hand saws and 12 inches for power-driven saws are seldom required. The rail saw is a modification of the hack saw, the height of the frame being increased to adapt it for large work, such as the cutting off of rails, large beams, girders, etc., and is found to be a very valuable tool for contractors. The frames are fitted to carry blades ranging from 9 to 18 inches in length.

The cross-cut saws employed for cutting timber and other large work are made in an almost innumerable variety of forms and sizes, both as to the blades and to the teeth. The "one man" saws, shown in Fig. 15, range from three to six

SAWYER

feet in length. The particular saw illustrated has the famous "Great American" tooth, commonly known as the M tooth. Fig. 1 shows three forms of the larger saws. They range from

plete translation of the Bible, that of the New Testament being published in 1858, the prophetic books of the Old Testament in 1860, and some of the remaining books in 1864. In some

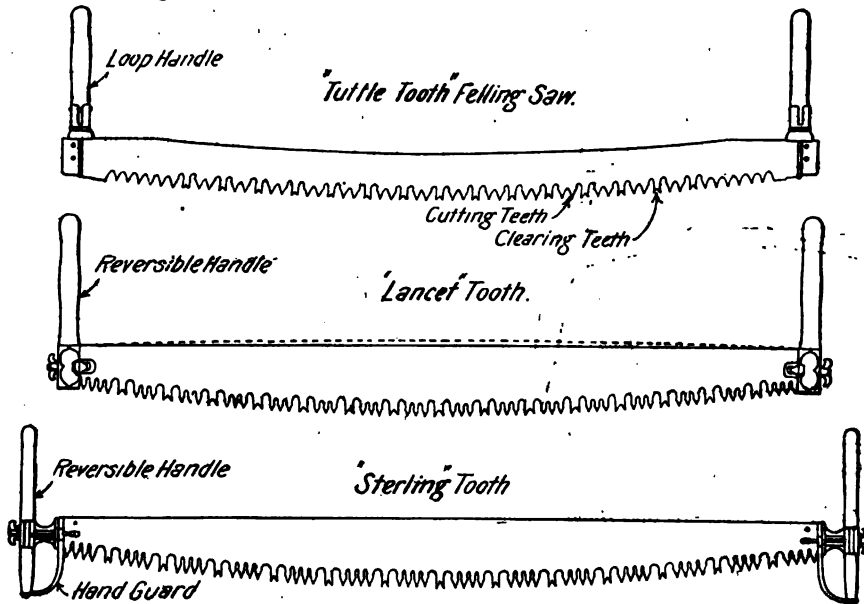


Fig. 16.

4 to 10 feet in length and are operated by two men, one at each handle. They are made with either curved or straight backs, but are always round-breasted, and differ in this respect from the "drag" and "pit" saws, in which the toothed edge is always straight.

The various forms of circular saws will be found described in the article under the title WOOD-WORKING MACHINERY, in this Encyclopedia.

Sawyer, sā'yer, SIR James, English physician: b. Carlisle, Cumberland, 11 Aug. 1844. He was educated at Queen's College, Birmingham and at the London University. He is consulting physician to the Queen's Hospital at Birmingham, and the author of several important medical works. Among them are: 'Floating Kidney' (1883); 'Ether in Medication by the Skin' (1890); and 'Causes and Cure of Insomnia' (1904); 'Dietetics of Diabetics' (1904); 'Longevity' (1905); etc.

Sawyer, Josephine Caroline, American novelist: b. Watertown, N. Y., 5 Sept. 1878. She was educated in her native town, and Pelham Hall, Pelham Manor, N. Y., and has published 'Every Inch a King' (1901); 'All's Fair in Love' (1904).

Sawyer, Leicester Ambrose, American clergyman and biblical scholar: b. Pinckney, N. Y., 28 July 1807; d. 1898. He was educated at Hamilton College, studied at Princeton Theological Seminary, and in 1832 entered the Presbyterian ministry. After filling pastorates in New York and Connecticut, he became president of Central College, Ohio. In 1854 he withdrew from the Presbyterian denomination and joined the Congregationalists. He made a com-

plete translation of the Bible, that of the New Testament being published in 1858, the prophetic books of the Old Testament in 1860, and some of the remaining books in 1864. In some

Sawyer, Sylvanus, American inventor: b. Templeton, Mass., 15 April 1822; d. Templeton 25 Oct. 1895. His attention was early turned to invention and in 1839 he engaged in business with his brother-in-law in Augusta, Maine, and invented a steam engine, a screw propeller, and a car run by foot-power. His first big invention, however, was the machine for making chair-cane from rattan, first invented in 1843 and used in his factories after 1850. Sawyer then turned his attention to gun and rifle projectiles and made important inventions, his projectiles making the rifled cannon a practicality. He also invented in 1853 an arrangement by which shells would explode on impact, by use of percussion caps. These inventions were put into use and did great service against the Confederacy in the ensuing war. Other inventions, after the war, perfected the cast-steel rifled guns, the first battery of which he furnished. His other inventions include: 1867, calipers and dividers; 1868, steam generator; 1876, sole sewing-machine; 1882, centring watchmaker's lathe. The closing years of his life were enthusiastically devoted to agriculture.

Sawyer, Thomas Jefferson, American Universalist clergyman: b. Reading, Vt., 9 Jan. 1804; d. 1899. He was graduated at Middlebury

College in 1829, and held pastorates in New York (1830-45 and 1852-61). Between these periods he served as principal of the Liberal Institute at Clinton, N. Y., in which he also taught theology. He was one of the founders of Tufts College, Medford, Mass., where he became professor of theology. As an advocate of Universalist doctrine, and as a scholarly controversialist he acquired a wide reputation. His discussion with Isaac Westcott was published under the title of 'The Doctrine of Eternal Salvation' (1854). He also published 'Who is Our God? the Son or the Father?' (1859), in which he controverted in particular some of the opinions at that period held by Henry Ward Beecher.

Sawyer, Walter Leon, American author: b. Cumberland, Maine, 23 Oct. 1862. He was educated in Portland, Maine, was editorially connected with journals in Portland, Washington, and Boston, 1882-92, and was an assistant editor of 'The Youth's Companion' 1892-1901. He has published 'An Outline Journey' (1896); 'A Local Habitation' (1899).

Saxe, säks, John Godfrey, American poet: b. Highgate, Vt., 2 June 1816; d. Albany, N. Y., 31 March 1887. He was graduated at Middlebury College and admitted to the bar in 1843. During 1850-6 he conducted the 'Sentinel' at Burlington, Vt., and in 1856 became attorney-general of Vermont and deputy collector of customs. Removing to Albany, N. Y., he edited the *Evening Journal*. He was a conspicuous figure on the lecture platform and at scholastic anniversaries, where he often read his verse. His reputation as a humorous poet was considerable during the mid-century, his verses often appearing in 'Harper's Magazine' and in the 'Knickerbocker.' He published 'Progress, a Satirical Poem' (1846); 'Humorous and Satirical Poems' (1850); 'The Money King and Other Poems' (1859); 'The Masquerade and Other Poems' (1866); 'Fables and Legends of Many Countries' (1872), and 'Leisure Day Rhymes' (1875).

Saxe, Maurice, marshal of France: b. Dresden 28 Oct. 1696; d. Chambord, near Blois, France, 30 Nov. 1750. He was a natural son of Augustus II. of Poland. His military career was begun at the age of 12 and a few years later was put in command of a cavalry regiment which took part in the war with Sweden. After the treaty of Utrecht, he attached himself to the army of France, and in 1720 was made camp marshal to the Duke of Orléans. He was offered the command of the Saxon army at the death of his father, but chose to remain in the French service. For his defense of Alsace in 1743 he was created marshal of France. Carlyle has described his heroic conduct in the battle of Fontenoy, in his life of Frederick the Great. He was one of the most fearless but also one of the most dissolute men of his day. He wrote with a singular disregard of the rules of orthography a book on the art of war, entitled, 'Mes Réveries.' Consult: Karl von Weber, 'Moritz von Sachsen' (1863); Duc de Broglie, 'Maurice de Saxe et le Marquis d'Argenson' (1891-3).

Saxe-Altenburg, säks äl'ten-bërg. See ALTENBURG.

Saxe-Coburg-Gotha, kō'bërg gō'ta, Germany, comprising the provinces of Gotha and Coburg, constitutes one of the central states of the empire, containing an area of 755 square miles. It lies on the south side of the forest of Thuringia. Its principal rivers are the Apfelstedt, Gera, Leina-Horsel, Nesse and Unstrut, in Gotha, and the Itz, Rodach, Lauter and Steinach, in Coburg. Both parts are mountainous with undulating and fertile tracts. The highest summits are the Great Beerberg (2,850 feet), the Schneekopf (2,829), and the Inselberg (2,655). The government is a constitutional monarchy. The educational institutions are gymnasiums at both Gotha and Coburg; Salzmann College at Schnepfenthal; commercial school, Gotha; teachers' seminaries and technical schools in both towns; deaf and dumb institute, Coburg; and an observatory near Gotha. The Lutherans predominate. The chief occupations are agriculture and cattle-raising, especially in Coburg. The products are grain, peas, beans, hops, hemp, flax, potatoes (principal article of food), and wine. The forests yield timber, pitch, charcoal and potash. The chief manufactures include machinery, fire-proof safes, nickel goods, rifles, papier-maché, tobacco pipes, watches, toys, needles, and pottery; besides textile, button and paper industries. There are also numerous breweries, distilleries, tanneries, bleaching establishments and saw-mills. The chief exports are grain, butter, fat, cattle, leather, wood, linen and other manufactured goods. Ruhla is celebrated for its meerschaum pipes and cigar holders, which are exported to all parts of the world. Inselberg, Schneekopf, Ruhla and Friedrichroda are picturesque towns and summer resorts; Neudietendorf or Gnadenenthal is a Moravian settlement founded in 1742. The elder line of Saxe-Coburg was founded in 1680. The duke of Albany, grandson of Victoria of England, succeeded to the duchy in 1900. Pop. about 235,000.

Saxe-Meiningen, mī'ning-ën, or **Saxe-Meiningen-Hildburghausen**, hild'boorg-how-zën, Germany, a central duchy of the empire, in Thuringia. It belongs to the basins of three great rivers, the Weser, Rhine and Elbe; is hilly, and covers 953 square miles. The ridges on the north belong to the Frankenwald, on the east to the Thüringerwald, and on the west to the Rhöngebirge. The highest summits are the Kieserle and the Bless, respectively 2,851 and 2,834 feet high. The high land is interspersed by fertile valleys, watered by the Werra, and various tributaries of the Main and the Saale. There are several small lakes and some mineral springs. The soil is not very productive; in the higher districts it is unfitted for cultivation, but well wooded. The best land is in the valleys of the Werra and Saale. The chief crops are rye, oats, barley, potatoes and wheat. Hops, flax, tobacco and some wine are also grown in sheltered localities. The pastures are good, so that stock-raising is important. The chief minerals are roofing slate, salt and iron. There is a brisk manufacturing industry, especially in Sonneberg, Gräfenenthal, and Saalfeld. The principal articles include various kinds of hardware, glass, and pottery, school-slates, marbles, all kinds of ingenious wooden and pasteboard objects, especially toys; and there is also a small

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textile industry. The principal exports, outside of the articles just mentioned, are wood, salt, wool, and cattle. The schools include gymnasia, a normal college, technical schools, etc. The capital is Meiningen, with 14,518 inhabitants, who are mostly Lutheran. The government is a hereditary and limited monarchy. The line of Saxe-Meiningen was founded by Duke Bernhard, son of Ernst I. of Saxony, friend and companion of Gustav Adolf of Sweden. Two-thirds of its present territory was added in 1826. In 1866 it sided with Austria. A compromise in 1871 terminated the long dispute, dating from 1826, concerning the respective rights of the duke and the diet to the state-lands. Saxe-Meiningen entered the North German Confederation with the other States. Pop. about 275,000.

Saxe-Weimar, vī'mār, or **Sachsen-Weimar-Eisenach**, i'zē-nāh, Germany, a grand duchy, central in the empire, the largest of the Thuringian states, consisting of 3 large and 24 smaller divisions, the former comprising Weimar, Neustadt and Eisenach. The entire area comprises 1,388 square miles. The state is of circular form, with undulating surface, and fertile soil. The Ilm, Saale and Unstrut are the principal rivers. The chief towns: Weimar, the capital, on the Ilm; Jena (with the general university of Thuringia), on the Saale; and Apolda, in the west. Eisenach, the second division in size, yields the poorest crops, contains fine forests and picturesque scenery. Its chief streams are the Werra, Horsa and Ulster. Its highest summits are: The Hohe Vogelheid, Glockner, Ringberg and Ottowald; the Hohe Rain, Elnbogen, Bayerberg and the Glaserberg. Eisenach is the only considerable town. Neustadt has no especially interesting features; its principal rivers are the White Elster, Weida and Orla. Neustadt, Auma and Weida are the chief towns. The chief occupation is agriculture in all parts of the duchy, and stock-raising is carried on to some extent. The manufacturing industries are important and include textiles, especially woollens, pottery, scientific instruments, pipes, tobacco, leather, cork, paper and glass. The chief imports, besides colonial goods, are raw wool, hides, coal, meerschaum (from Smyrna and Vienna), amber, horn, etc. The chief exports are timber, wool, gin, and dried fruit. The chief centres of trade are Eisenach and Weimar. There are numerous breweries. The minerals are silver, copper, iron, manganese; besides salt and potters' clay. The government is a limited hereditary monarchy and is constitutional. Most of the inhabitants are Lutherans, distinguished for their industry and intelligence. The reigning family is the oldest branch of the Ernestine line, thus of the Saxon house. Weimar in early times was the seat of a line of counts; it finally fell into possession of Frederick the Mild of Saxony, and did not acquire historical independence until 1640. Later it was split into several factions, but became reunited under Ernest Augustus. The reign of Charles Augustus, his grandson, marks the most brilliant epoch in the history of Saxe-Weimar. Goethe, Schiller, and Herder were members of the illustrious literary society which Charles Augustus gathered about him, and the University of Jena became a focus of light and learning. This prince granted the

duchy a constitution, and freedom of the press. In 1866 the grand duchy joined Prussia against Austria, and later entered into the North German Confederation. The tendency of recent legislation is liberal.

Sax'horn. See HORN.

Saxic'ava, a genus of bivalved mollusks. See STONE-BORING ANIMALS.

Sax'ifrage, a plant of the typical genus of *Saxifragaceæ*, the name arising from an old Roman notion that the plants, which they often saw growing in cracks in rocks, had split the rocks themselves, and applying the doctrine of signatures. (q.v.), they concluded that the saxifrage would also break up stones in the bladder. The many species of saxifrage are found chiefly in the north temperate and arctic zones, increasing in number northwards; they are also characteristic of sub-alpine and alpine floras. This northern and mountain habit has made them valuable for rock-gardening, especially as the Alpine species have comparatively large flowers. The species are easily propagated by stolons and offshoots. Saxifrages are closely allied to the *Rosaceæ*, and have numerous regular flowers, mostly in corymbs or panicles, and white, yellow or pink in color. The individual flowers are generally small, five-merous, with a two-celled ovary, becoming a small two-beaked pod with many seeds.

The London Pride (*Saxifraga umbrosa*) is much cultivated in European gardens, and sends up from a rosette of thick glabrous leaves small pink flowers panicked on a stem nearly a foot high. The purple saxifrage (*S. oppositifolia*) is one of most widely distributed species of Alpine and Arctic floras, and one of the first to bloom. It extends as far southward in the United States as Vermont, and carpets the rocks with its evergreen mats of thick foliage, nearly covered with solitary lilac blossoms. The most familiar saxifrages in eastern America are the *S. virginensis* and *S. pennsylvanica*. The former is one of the first spring plants to bloom. It grows in rock-crevices and begins to open its small white flowers, while they are still close to the rosette of spatulate leaves. As the spring advances, the naked, pubescent flower scape elongates until, in fruit, it is perhaps a foot high and branched in a loose panicle. The swamp saxifrage (*S. pennsylvanica*) is a little later in blooming, larger, and frequents swamps and wet banks; it has greenish flowers in panicles, and oval to oblanceolate leaves.

Saxo Grammaticus, sāk'sō grā-māt'f-kūs (that is, Saxo the Grammarian, or the Learned), early Danish historian: b. about 1140; d. Roeskilde about 1206. He was a native of Denmark, of which kingdom and its dependencies he compiled history down to 1186 under the auspices of Absalom, bishop of Roeskilde, whose secretary or chancellor he appears to have been. This work, 'Historia Danica,' is written in good correct Latin, which Erasmus has praised, and occupied 20 years in its composition. Saxo chose as his models the later Roman historians, especially Valerius Maximus, yet in some of his expressions and in his mode of representation he is quite mediæval, though he stands at the head of his class. The work is divided into 16 books, the earlier of which give a highly colored and imaginative account of ancient Dan-

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ish history, as learned from tales and traditions, and is full of living pictures of old heroic wars and adventures; the first nine books can scarcely be looked upon as reliable history; but when the writer approaches his own time his history is of the greatest value.

Saxon, the name of a Teutonic race, which took part with the Angles in founding Anglo-Saxon dominion in Britain, and which until a recent period was an important power in Germany. The Saxons (German *Sachsen*) were a warlike people, somewhat given to piracy, and during the existence of the Western Empire a thorn in the side of Rome. Charlemagne subdued them, and caused them to become Christians. After the extensive Saxon emigration to Britain in the 5th century, those who remained in Germany were known as "Old Saxons." The dukedom of Saxony was for a time the most powerful of the German states, and Duke Henry in 919 was elected German king, his son, grandson, and great-grandson succeeding him in that dignity. The duchy afterward passed (1127) to the Bavarian branch of the Guelph family, of which Henry the Lion (q.v.), celebrated for his contest with the emperor, was a member (1146-95). After several changes, which it is unnecessary to enumerate here, Frederick the Warrior, margrave of Meissen and landgrave of Thuringia, became (1424) duke and elector of Saxony. The union of these three countries rendered the Saxon elector one of the most powerful princes in Germany. After the death of Frederick the Good, son of Frederick the Warrior, Ernest and Albert, sons of the former, divided the family possessions between them (1485), and founded the Ernestine and Albertine Saxon lines, which still exist. The latter received Meissen, or Misnia, and now constitutes the royal Saxon house. The former retained the electoral dignity and Thuringia. Ernest was succeeded in the electorate by his sons, Frederick the Wise (1486-1525), and John (1525-32). The former is celebrated as the protector of Luther, the promoter of the Reformation, and the founder of the University of Wittenberg. By the Wittenberg capitulation (19 May 1547) the electoral dignity was transferred to the Albertine line in the person of Maurice. The Ernestine house is now divided into the two branches of Weimar and Gotha, the latter of which consists of the three lines of Meiningen, Altenburg, and Coburg.

The duchy became a kingdom under Frederick Augustus I., who paid by the loss of a large part of his dominions the penalty for taking the side of Napoleon in the struggle between France, on the one side, and Russia, Austria, Prussia, England, and Sweden on the other. Saxony made another expensive blunder when it allied itself with Austria against Prussia in 1866, when the kingdom was spared on condition of paying 10,000,000 thalers to Prussia and entering the North German Confederation. In the war of 1870 against France the Saxons were on the side of Prussia, and the feeling between the two courts has since been cordial. The Saxon people have ceased to be distinct from other Germans, and national patriotism has taken the place of sectional jealousy. The Saxons possess the virtues, without the faults of their distant ancestors, and are noted for industry, frugality, and thrift, while the average

of comfort among the industrial and agricultural classes is as high as in any part of Europe. See GERMANY; SAXONY.

Saxon Architecture, the stage of early English architecture which preceded the Norman. The relics left us of this style exhibit its general characteristics as having been rude solidity and strength. The walls are of rough masonry, very thick, without buttresses, and sometimes of herring-bone work; the towers and pillars thick in proportion to height, the former being sometimes not more than three diameters high; the quoins or angle masonry are of hewn stones set alternately on end and horizontally ("long-and-short" work); the arches of doorways and windows are rounded, or sometimes these openings have triangular heads, their jambs of long-and-short work carrying either rudely-carved imposts or capitals with square abaci. Sometimes heavy moldings run round the arches, and when two or more arches are conjoined in an arcade these are on heavy low shafts formed like balusters. Window openings are often splayed both from the inside and from the outside, and the windows themselves are small. On the outside of towers, walls, etc., there are often found slightly projecting pilaster-like shafts, usually formed of the long-and-short work characteristic of the quoins. See ARCHITECTURE.

Saxony, sāk'sn-ī (German, *SACHSEN*, zäk'sen), a kingdom of central Germany, surrounded by Prussia, on the north; Bohemia, south; Bavaria, southwest; Reuss, Saxe-Weimar, and Saxe-Altenburg, west. It covers an area of 5,787 square miles, and has the form of a right-angle triangle. Saxony ranks third in point of population among the states of the German confederation. It belongs to the central mountain region, only the districts near Leipsic and along the northern border sloping into the great north European plain. This tract is covered by peculiar and interesting sandstone formations. The chief mountain ranges are the Erzgebirge and Elstergebirge, along the southern border. The mountains of Upper Lusatia (2,600 feet) rise in the southeast, connecting with the Riesengebirge. That portion extending from Bohemia to Pirna on either side of the Elbe is wildly picturesque, hence the name "Saxon Switzerland." The highest summits in these mountains are no more than 2,000 to 2,500 feet high. The Fichtelberg in Oberwiesenthal (3,700 feet) towers above them all. The lowest point in the country is found where the Elbe enters Prussian territory, between Strehla and Mühlberg. The loftiest summits consist generally of sandstone and gneiss, and are rich in mineral deposits as the mountain ranges divide and merge into lower extensions, fertile valleys and plains are formed, suitable to agriculture. Most of Saxony belongs to the basin of the Elbe. At the east this river receives only minor affluents, but on the west, has several important tributaries, the chief of which are the Mulde and Elster, themselves formed by the junction of smaller streams. The lakes are numerous, particularly at the north, but insignificant. Mineral springs are numerous; the chief are: Bad Elster, Augustusbad, Neustadt, Warmbad (near Wolkenstein), Schweizermühle, Wiesenbad, Hohenstein, Marienborn, Tharandt,

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Grünthal (sulphur and iron), etc. The climate in the higher districts, called Voigtland, is cold, otherwise analogous to other countries of Europe in similar latitude. Unhealthy are only some marshy tracts on the Elbe and Pleisse. The Erzgebirge is that in which most rain falls. Leipsic enjoys the driest climate. Saxony is one of the most fertile parts of Germany, yet poor as compared to fertile soils elsewhere. Agriculture was long fettered by ancient customs, a condition no longer existing, and every inch of land now is developed to its utmost capacity. Sheep-farming has declined; cattle-raising is important. The forests are extensive and the mines, the oldest in Germany, are a great source of wealth. The principal crops are rye and oats, potatoes (Voigtland), beets (for feed) and flax (Erzgebirge and Lusatian mountains). Enormous quantities of cherries, plums, and apples are produced in the vicinity of Dresden, Leipsic, and Coldetz. Vineyards, chiefly interesting for their antiquity, are found on the banks of the Elbe near Meissen and Dresden. The chief mining districts are Freiberg, silver and lead; Altenberg, tin; Schneeberg, cobalt, nickel, and ironstone; and Johanngeorgenstadt, ironstone and silver mines. There are 236 mines, 150 of which are in operation, employing 8,615 hands. Coal occurs near Dresden and Zwickau. Peat is abundant in the Erzgebirge, sandstone on the hills of the Elbe; fine porcelain clay occurs near Meissen. Precious stones are found among the southern mountains, such as, jasper, amethysts, fine topazes, etc. The textile industry (employing 184,000 hands) is very important. The chief manufacturing centres are Zwickau, Chemnitz, Glauchau, Meerane, Hohenstein, Camenz, Pulsnitz, and Bishofswerda, and the principal articles are cotton, woolen, linen, damask and lace goods; other industries are straw-plaiting, wax-cloth, artificial flowers, stone and earthenware and porcelain ("Dresden china," celebrated); pianos, leather, cigars, paper, and all kinds of machinery, especially at Chemnitz and Dresden; printing presses, breweries, and distilleries; the smelting and refining foundries, chiefly at Freiberg. Leipsic is the centre of trade, especially for furs and books. The principal exports are the produce of the factories and mines. At the great annual Leipsic fairs at New Year, Easter, and Michaelmas alone, business amounts to \$50,000,000. Commerce has developed rapidly since the introduction of a railway system which covers 1,886 miles. Education in Saxony is highly cultivated, and its foundations of schools and universities of ancient date. The university and conservatory of music at Leipsic; the endowed schools at Meissen and Grimma; the mining academy at Freiberg, and school of forestry at Tharandt, are best known. The art collections of Dresden are celebrated. The government is a constitutional monarchy; the army raised by conscription. The reigning family descends from Wittkind, the native hero who was conquered by Charlemagne and converted to Christianity. The duchy was founded in 880, and in 1423 passed into possession of Frederick, Elector of Saxony. The Ernestine line was succeeded by the Albertine line, now occupying the throne. Frederick Augustus embraced the Catholic religion (1697) to obtain the crown of Poland. The succeeding monarchs fought against France for Poland, and in the

Seven Years' war joined their forces to those of Austria against France. After the battle of Jena, however, Frederick Augustus III., the Elector, and his army fought with Napoleon, who conferred on him the title of king. In 1807 and 1809, Saxony acquired large additions of territory, and in 1813 was the scene of Napoleon's struggles with his allies. The battles of Lützen, Bautzen, Dresden, and Leipsic were followed by a congress at Vienna, when much of Saxon territory was ceded to Prussia (1814). A period of progress followed, interrupted by the revolution of 1848-9. In the Austrian-Prussian war (1866) Saxony sided with Austria, and Prussia would have incorporated the kingdom, had not Austria, supported by France, interfered, and she was admitted into the North German Confederation. In the Franco-Prussian War, Saxony fought with the other German states against France. Albert (crown prince at that time) commanded the German forces at Meuse. Pop. (1900) 4,199,758.

Saxony, Orders and Decorations of. See **ORDERS, ROYAL.**

Sax'ophone, the name of a group of musical instruments invented by M. Sax. They consist of a conical brass tube, sounded by a mouthpiece furnished with a single reed similar to that of the clarinet. They have 20 holes covered by keys and studs for the first three fingers of each hand, and are all fingered alike.

Sax'ton, Joseph, American inventor: b. Huntingdon, Huntingdon County, Pa., 22 March 1799; d. Washington, D. C., 26 Oct. 1873. Having made his way to Philadelphia he was there employed in watchmaking and later in engraving, and devised, as his first invention, an ingenious machine for cutting the teeth of chronometer wheels. In 1830-7, after having constructed an astronomical clock with a compensating pendulum and original escapement, and having been admitted to the Franklin Institute, he was in England, where in June 1833 he exhibited before the British Association a magneto-electric machine. Here he won a considerable reputation as a maker of instruments of precision, constructing among various apparatus that by which Wheatstone measured the velocity of electricity in its passage through a long wire. Upon his return to the United States he was made constructor and curator of the standard weighing apparatus in the mint at Philadelphia, and in 1843 began the construction of the standard balances, weights, and measures to be presented to each State for securing uniformity. In 1851 he was awarded a gold medal for a large balance of great precision exhibited at the London World's Exhibition of that year. He was also somewhat of a student of archæology, geology, and mineralogy, and became a charter member of the National Academy of Sciences (1863). Consult the sketch by Henry in Vol. I of the 'Biographical Memoirs' of the National Academy.

Saxton, Rufus, American soldier: b. Deerfield, Mass., 19 Oct. 1824; d. Washington, D. C., 23 Feb. 1908. He graduated from West Point 1849 and 1855 became lieutenant. He led a surveying party across the Rocky Mountains 1853-4, was on the coast survey 1855-9 and instructor in military tactics at West Point 1859-60. He was chief quartermaster on the staff of General

Sayon in the Missouri campaign, participated in the West Virginia campaign under General McClellan in 1861 in the same position, and filled a like post with General Sherman in his Fort Royal expedition of 1861-2. He was commissioned brigadier-general of volunteers in 1862, and defended Harper's Ferry against General Jackson in 1862, receiving a medal from Congress in recognition of his services. In 1862-5 he was military governor of the Department of the South, was brevetted major-general of volunteers in 1865, and mustered out of the volunteer service in 1866. After the War he served as chief quartermaster in different departments until 1888 when he was retired with rank as colonel assistant quartermaster-general.

Say, Jean Baptiste, zhôn báp-têst sâ, French economist: b. Lyons 5 Jan. 1767; d. Paris 16 Nov. 1832. His early life was spent in England where he began a commercial career. The French Revolution called him to Paris, and his acquaintance with and interest in the social philosophy and political economy of his time to the staff of the famous 'Courrier de Provence,' the journal of Mirabeau. He was afterward secretary to Clavière, minister of finance. At the close of the Revolution he conducted 'La Décade,' a journal in which he presented with great clearness and ability the economic principles of Adam Smith, and such subjects as the public credit, the currency, and taxation. He wrote 'Catechisme d'Economie Politique' (1815-81); 'Lettres à Malthus' (1820); 'Cours Complet d'Economie Politique' (1828-30). Consult Guillaumin, 'Collection des Economistes.'

Sey, Thomas, American naturalist: b. Philadelphia, Pa., 27 July 1787; d. New Harmony, Ind., 10 Oct. 1834. He was one of the earliest entomologists, and is said to have discovered more species of the genus *Insectivora* than any naturalist before him. His contributions to natural science were contained in his reports upon his expedition to the coast of Georgia and Florida in 1818, and that as chief geologist to the United States Survey of the Rocky Mountain region under Major Long in 1819-20, and have been collected by later naturalists. He was one of the founders of the Academy of Natural Sciences in Philadelphia in 1812. In 1825 he joined Robert Owen in his communistic colony at New Harmony. Consult: 'American Conchology,' edited by Birney (1858); 'American Entomology,' with memoir, edited by Le Conte (1859).

Say and Sele, sêl, William Fiennes, Viscount, English politician and colonizer in America: b. 28 May 1582; d. 14 April 1662. From his first appearance in Parliament he was generally of the opposition, which found in him a tactician and debater of considerable skill. During the constantly increasing restiveness under the government of Charles I., he was a prominent malcontent; at the opening of the Long Parliament held high place in the Lords by reason of his identification with the popular party in the lower house; recruited a regiment for Parliament; but from 1647 advocated compromise, and at the king's death retired. On the restoration he was made lord privy seal. With Lord Brook and 10 other associates he obtained from Lord Warwick and the New

England Company a patent for a large tract on the Connecticut (19 March 1632). A shipload of colonists was sent over, and Saybrook (q.v.) was founded under the immediate direction of Lion Gardiner (q.v.). Say and Brook also purchased a plantation at Coheco (or Dover), in the present New Hampshire. Say later abandoned these enterprises, the Coheco estate being made over to Massachusetts, and Saybrook being sold to Connecticut. Consult Palfrey, 'History of New England' (1858).

Saybrook, Conn., town in Middlesex County; at the mouth of the Connecticut River, on the New York, New Haven & Hartford railroad; 20 miles east of New Haven. It was first settled at Saybrook Point by the English in 1635. The town was incorporated in 1667, since then several townships have been separated from the original town; these are Chester (incorporated 1836), Old Saybrook (1852), Centerbrook (added to Essex, 1859). The industries include the manufacture of ivory goods, of augers, gimlets, and other small metal articles, and a box factory. The town-hall contains all the official records of the original town of Saybrook. There is a public high school, established in 1892. The Collegiate School of Connecticut (now Yale University) was located at Saybrook from 1701-16. Pop. (1890) 1,484; (1910) 1,907.

Saybrook Platform, a declaration of principles adopted in 1708 by the Congregational Church synod at Saybrook; substantially the same as the Cambridge platform (q.v.).

Sayce, sâs, Archibald Henry, English Assyriologist: b. Shirehampton, near Bristol, 25 Sept. 1846. He received his education at Queen's College, Oxford, where he was graduated in 1868. He was elected a fellow in the following year and became a tutor in 1870. In 1876 he was appointed deputy professor of comparative philology at Oxford, and since 1891 has occupied the chair of Assyriology in the same university. He was a member of the Old Testament Revision Company. He is an honorary member of the Asiatic Society of Bengal, the Royal Academy of Spain, and the Anthropological Society of Washington. His larger and more important works are: 'An Assyrian Grammar for Comparative Purposes' (1872); 'The Principles of Comparative Philology' (1874); 'The Astronomy and Astrology of the Babylonians' (1874); 'Lectures on Babylonian Literature' (1877); 'Introduction to the Science of Language' (1880); 'The Vannic Inscriptions Deciphered and Translated' (1882); 'The Ancient Empires of the East' (1884); 'The Origin and Growth of Religion as illustrated by the Religion of the Ancient Babylonians' (1887); 'Life and Times of Isaiah' (1889); 'The Higher Criticism and the Verdict of the Monuments' (1894); 'Early History of the Hebrews' (1897); and 'Babylonians and Assyrians' (1900). The following popular works: 'The Monuments of the Hittites' (1881); 'Assyria: its Princes, Priests, and People' (1882); 'The Hittites' (1889); 'The Races of the Old Testament' (1891); 'Social Life among the Assyrians and Babylonians' (1893); 'The Egypt of the Hebrews and Herodotos' (1895); and 'Israel and the Surrounding Nations' (1898).

Sayles, sālz, John, American jurist: b. Vernon, N. Y., 9 March 1825; d. Abilene, Texas, 22 May 1897. He was graduated from Hamilton College, Clinton, N. Y., but studied law in Texas, where he was admitted to practice in 1846. In 1851 he was appointed to the Supreme Court of his adopted State, and from 1853 to 1855 served in the Texas legislature. His first contributions to the literature of jurisprudence were published soon after the close of the Civil War, in which he served as brigadier-general in the Confederate Army. In 1880 he became a professor of law in Baylor University, Texas. His writings include: 'A Treatise on the Practice in the District and Supreme Courts of Texas' (1858); 'Treatise on the Civil Jurisdiction of Justices of the Peace in the State of Texas' (1867); and 'Revised Civil Statutes and Laws Passed by the Legislature of Texas' (1888).

Sayre, sār, David Austen, American philanthropist: b. Battle Hill, N. J., 12 March 1793; d. Lexington, Ky., 11 Sept. 1870. He removed to Lexington where he established a mercantile business and later became a banker. He acquired a large property, was the founder of Sayre Institute at Lexington, Ky., to which he gave \$100,000, and he disposed of about \$400,000 in other benevolent projects.

Sayre, Lewis Albert, American surgeon: b. Battle Hill (now Madison), N. J., 29 Feb. 1820; d. New York 21 Sept. 1900. He was graduated from Transylvania University in 1839, and three years later from the College of Physicians and Surgeons in New York. He was made professor of orthopedic surgery in the medical college of Bellevue Hospital in 1861, and professor emeritus at its consolidation with the New York University in 1898. In 1854 he successfully performed the first operation in the United States for the removal of the head of the femur in hip-joint disease, and became known as the greatest American orthopedist. His original methods and his invention of instruments used in the treatment of deformed children made his name familiar to the entire medical world. He was the author of 'Practical Manual of the Treatment of Club Foot' (1869); 'Orthopedic Surgery and Diseases of the Joints' (1876); etc.

Sayre, Robert Heysham, American civil engineer: b. Columbia County, Pa., 13 Oct. 1824; d. 4 Jan. 1907. He entered the engineering corps engaged in the enlargement of the Morris Canal, N. J., in 1840, and was subsequently employed in various canal, railroad, and mining enterprises. He was chief engineer of the Lehigh Valley Railroad in 1855-82, supervising extensions north and west. He was president and engineer of the Southern Pennsylvania Railroad and was largely interested in various iron works and other corporations. He was one of the first to introduce iron bridges, and began the use of steel rails in 1864.

Sayre, Stephen, American banker and patriot: b. Long Island 1734; d. Virginia 27 Sept. 1818. He was graduated from the College of New Jersey (Princeton) in 1757, became a merchant and banker in London, attained there considerable influence in political circles, but was committed to the Tower on an unwarranted charge of treason. The affair soon ended in

his release; but his banking business failed, as a result, and he was compelled to withdraw from England. Subsequently he was private secretary to Franklin, went with Arthur Lee's embassy to Berlin, and at Copenhagen, Stockholm, and Saint Petersburg was successful in obtaining supplies for the furtherance of the cause of independence. He was an opponent of Washington's administration in 1795.

Sayre, Theodore Burt, American novelist and playwright: b. New York 18 Dec. 1874. He was graduated from the New York College of Pharmacy in 1892, but almost immediately began to write for the stage. In 1896 his 'Wife of Willoughby' was produced at the Lyceum in New York and in the following year his 'Charles O'Malley' at the Lafayette in Washington. He has since produced other plays and the novels: 'Two Summer Girls and I' (1898); 'The Son of Carleycroft' (1900); 'Tom Moore' (1902).

Sayre, Pa., borough in Bradford County; on the North Branch of the Susquehanna River, and on the Lehigh Valley Railroad; about 15 miles north of Towanda, the capital of the county, and 18 miles southeast of Elmira, N. Y. Sayre is in an agricultural region and near the coal fields of the State. The industries are connected chiefly with farm and dairy products. The chief industrial establishments are machine shops, stove fixture works, metal works, lumber and coal yards. There is considerable trade in the shipment of farm and dairy products and poultry. The borough has a high school, elementary schools, and a public library. Pop. (1910) 6,426.

Sayula, sā-yoo'lā, Mexico, a town in the state of Jalisco, situated 55 miles south of Guadalajara. Agave and sugar are cultivated in the surrounding country, and the town has a thriving commerce.

Sbaretti, sbā-rēt'tē, Donatus, Italian Roman Catholic prelate: b. Montefranco, Italy, 12 Nov. 1856. He was educated at the College of Saint Apollinaris, Rome, and was ordained in 1879. For eight years after his ordination he occupied the chair of speculative and moral philosophy in the College of the Propaganda, Rome, and subsequently served as sub-secretary of the Propaganda in affairs concerning the United States. He was made private chamberlain to Leo XIII., with title of Monsignore, and in 1893-1900 was the first to occupy the office of auditor of the Apostolic Legation at Washington. He was consecrated bishop of Havana in 1900, appointed extraordinary Apostolic Delegate to the Philippines in 1901, titular archbishop of Ephesus later in that year, and since 1902 has been Delegate Apostolic to Canada.

Scab, or Scabies, a skin disease in sheep, analogous to the itch in the human subject and to mange in horses and dogs. It is caused by a parasitic mite, *Sarcoptes scabiei*. See ITCH.

Scabbard-fish, the name of certain pelagic fishes, allied to the mackerels, and so called because of their compressed and elongated shape. One is *Lepidopus caudatus*, rare in American waters, but known in the Eastern Atlantic, Indian, and South Pacific oceans. It is the "frost-fish" of New Zealand, where it comes ashore in the surf on moonlit winter nights, and is

SCAD—SCALE INSECTS

caught on the beach by men watching for it. It is a favorite food-fish, and reaches a length of five or six feet, but weighs only about six pounds. Another is the cutlass-fish, silver-fish, or hair-tail (*Trichurus lepturus*), which attains a length of four feet or more, and whose tail ends in a filiform point without a caudal fin. It is found on the American coast from New England to South America, and is silvery, with a golden lateral line and grayish yellow dorsal; the lower jaw is the longer, with two teeth projecting beyond the upper when the mouth is closed, and the whole armature of the jaws indicates carnivorous habits. It is rarely seen except when found benumbed with cold floating on the surface.

Scad, a name given to several species of fishes of the family *Carangidae*; in the United States to *Decapterus punctatus*, a fish about a foot long found along most of our Atlantic coast and abundant southward, where it is a food-fish of some importance. In England the name belongs to the fish also called horse-mackerel (*Trachurus trachurus*) which appears in large shoals and is dusky olive on the back, the sides variegated by bands of bluish. It is also known as saurel. A related species (*Trachurus crumenophthalmus*), common in the West Indies, and known on most tropical coasts, is called big-eyed scad.

Scad'ding, Henry, Canadian Anglican clergyman: b. Dunkswell, Devonshire, England, 29 July 1813. He removed to Canada in childhood, earned a scholarship to Saint John's College, Cambridge, England, and was graduated from there in 1837. Returning to Canada in 1838 he took orders in the Church of England and was rector of Holy Trinity Church in Toronto, the first free church in that city, 1847-75. He was editor of 'The Canadian Journal of Science, Literature, and History' (1868-78), and has published 'Shakespeare, the Seer, the Interpreter' (1864); 'Four Decades of Upper Canada' (1865); 'Truth's Resurrection' (1865); 'Christian Pantheism' (1865); 'The First Bishop of Toronto' (1868); 'Toronto of Old' (1873); 'Early Pioneer Life in Canada' (1887); etc.

Scævola, sĕv'ō-la, **Caius Mucius**, Roman hero and founder of the plebeian family of Mucii: lived about 600 years B.C. Livy tells how Caius Mucius, a young patrician, sought to kill Porsenna of Clusium, the protector of the expelled Tarquins, who was besieging Rome and had reduced the city to great distress. Mucius went to the tent of Porsenna to kill him, but mistaking his secretary for the chief plunged his sword into him. Porsenna, in rage, had Mucius brought before him, whereupon the young Roman expressed regret at not having killed Porsenna himself, and told him that other attempts would be made and would be successful. Upon Porsenna threatening to have Mucius burned alive if he did not betray the conspirators, Mucius thrust his right hand into a flame and held it there. Porsenna, in admiration for this fearlessness, ordered the young Roman freed, and the latter in return of courtesy told Porsenna that 300 Roman youths had sworn to assassinate him or die in the attempt. This so alarmed Porsenna that he raised the siege and withdrew from Rome. Scævola, meaning "the left-handed," was the name bestowed upon Mucius in honor of his

deed. Quintus Mucius, called "the augur," a Roman tribune, prætor, and consul, d. about 100 B.C., and Quintus Mucius, called "the pontifex," Roman tribune, consul, and pontifex maximus, d. 82 B.C., are descended from Caius Mucius Scævola.

Scafell, ska-fĕl', or **Scaw Fell**, England, a mountain in the county of Cumberland, bordering on Westmoreland, 13 miles southwest of Keswick. It rises from the centre of the lake region, its two peaks reaching an elevation respectively, of 3,229 and 3,092 feet, making the mountain one of the conspicuous features of the scenery. It consists of granite with a superformation of slate, excepting the summit which is composed of trap porphyry.

Scagliola, skāl-yō'la, an Italian term for an imitation marble used in columns, walls, and floors for surface decoration. It was invented by Guido del Conte in Modena in the early part of the 17th century. It is composed of plaster and glue mixed with splinters (scagliole) of spar, marble, granite, concrete, gypsum, veins of clay, etc., artificially colored, and smoothed down and polished to a semblance of the quality of polished marble.

Scafie, **Walter Bell**, American author: b. Pittsburg, Pa., 10 Sept. 1858. He was graduated from the University of Michigan in 1880, and since 1889 has lectured at Baltimore, Pittsburg, Washington, and Boston on history and other subjects. He has published 'American Geographical History, 1492-1892'; 'Florentine Life During the Renaissance'; 'A Dissertation on Law and History'; also 'A History of Geographical Latitude' (1889).

Scala, La, lā skā'la, Milan, Italy, a historic theatre and opera house opened in 1778, with accommodation for 3,600 auditors.

Scald-head, an affection of the scalp, as ringworm of the head, etc., the term being vulgarly applied to various disorders similar in nature. See RINGWORM.

Scalda. See BURNS AND SCALDS.

Scale Insects, certain species of the family *Coccidae* (see COCCUS). Some species of this family are popularly called mealy bugs more often than scales; such species are readily distinguished by being free-moving, whereas the scales are stationary except for a few hours after birth or hatching. The males of the family are remarkable in having a complete metamorphosis (other *Hemiptera* have incomplete, and so do the females of this family), one pair of wings, a pair of hooks replacing the rear wings, and an extra pair of eyes in the adult, instead of mouthparts. The female has six legs when newly hatched, but after molting the legs are wanting and the insects are grub-like, stationary, wingless, and are concealed beneath a powdery, cottony, or waxy secretion and the cast-off skins. On account of their appearance some of the species are called gall insects, a name more correctly applied to species of the family *Cynipidae* and *Gallicola*, which produce nut-galls or galls.

The family embraces several species which have been used by man for many centuries and also some that are regarded as troublesome upon cultivated plants. The scarlet grains of Poland are scale insects (*Coccus polonicus*) which are found on the roots of knawel and were formerly

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an important article of commerce, being used in dyeing various fabrics. Another species found on the roots of burnet has long been used by the Moors for dyeing wool and silk various tints of pink. Kermes or scarlet grain is the dried body of *Lecanium ilicis* which lives on the young shoots of the kermes oak (*Quercus coccifera*), a low evergreen shrub common from Spain eastward to India. In parts of this region this insect furnished a source of revenue to the people. The females grow about as large as peas and before the eggs are hatched, during May, they are gathered, dropped into vinegar, dried in the sun or in ovens, and sold. They have been used for ages to dye cloth a dark brownish-red, but except locally they are almost entirely superseded by cochineal. (See COCCUS.)

Cochineal is a species (*Coccus cacti*) of the mealy bug group. It is a native of Mexico where it feeds upon certain species of cactus, especially the nopal (*Opuntia cochinellifera*), a kind of prickly pear (q.v.). It is also found in many regions where this plant has been introduced, notably in the Canaries, Java, and the Mediterranean region, in some parts of which it has been cultivated. In Mexico pieces of the cactus covered with the insects are cut out at the close of the dry season and protected until the end of the wet season, when they are used for re-stocking the plantation in October. The females lay about 1,000 eggs, about 99 per cent of which produce females. In December the first crop is gathered and other harvests are made until May when the rainy season commences. The females are brushed off the plants, killed by heat, either in ovens, boiling water, or on hot irons, and dried. They usually lose more than half their weight in the process. A day's work is represented by about two ounces of dried insects—that is, more than 8,000! These insects have been used for dyeing scarlet and crimson, for which purposes they are unequaled, though coal tar products, being cheaper, more readily procured, and in greater variety, have largely replaced them. They are used also for manufacturing pigments such as lake and carmine (q.v.) and for coloring confectionery. See COCHINEAL.

Several other species have been used for dyeing, some being employed by the ancient Egyptians, Jews, and Persians for giving the brilliancy or delicacy of tint to certain fabrics formerly highly valued by these nations and the peoples embraced in their commerce.

Other members of the family are noted for their wax, which is used in some countries for candles, varnishes, sealing wax, lacquer, and many other purposes. The wax insect of China (*Coccus sinensis*) is a small white species which lives upon sumac and other trees upon the branches of which it deposits its secretion. This resembles hoar frost during June, but becomes somewhat darker and more continuous by August when it is scraped off and melted in boiling water. After straining and cooling it is ready for use. The French have introduced this species into Algeria. In South America another species is locally, but not commercially, important as a source of wax and in other countries are several species that might become similarly useful. But the principal species are the lac or shell-lac insects of Asia. (See LAC.)

Among the species considered troublesome upon cultivated plants perhaps the cottony cush-

ion scale (*Icerya purchasi*) is perhaps the most noted in the United States. This is an Australian insect which was accidentally introduced into California where, being free from the conditions that held it under control in its native habitat it spread rapidly upon orange, lemon, and other citrus trees to the dismay of the orchardist. It was found that certain species of lady-bird beetles (q.v.) play important roles in checking the spread of this scale in Australia; and so, some were imported in the hope that they would eradicate the scale in California. They did. The scale is now practically extinct in California and the lady-bird beetles, being deprived of their food supply, have followed it, since they seem to be unable to adapt themselves to other foods. This is one of the most remarkable instances of man's intervention to bring natural controls to his aid instead of resorting to artificial methods which are frequently cumbersome or unsatisfactory.

The armored scales of the sub-family *Diaspidæ* are generally of small size, but being exceedingly prolific and voracious are often held in ill-repute. They are generally flattened or slightly convex and covered with a parchment-like membrane, and are of many shapes. The larvæ are either hatched from eggs or are born. They crawl to a suitable place to feed, usually before they are a day old, and become fixed. They are tiny, flat, six-legged larvæ with a pair of feelers and with a long sucking beak which is soon put to use. Soon waxy threads appear, coalesce and cover the creatures. After molting the larvæ are legless. After the second molt the males can be readily recognized, being a pupa with wings, legs, and antennæ visible; the females become still more grub-like. The male soon emerges, flies a short time, pairs, and dies. In some cases the females hibernate, in others they lay eggs, in others bear young, sometimes there may be several generations in a season. Some of the best-known species are the oyster-shell bark-lice, especially *Mytilaspis pomorum*, which is well known upon apple, lilac, willow, and other trees. They are named from the shape of the scale, which resembles the shell of some kinds of oysters. This species winters in the egg, the young appear in May, and in the North there is only one brood; two in the South where the insects are believed to hibernate. A very similar species lives upon citrus fruits, and specimens may often be found upon oranges and lemons, especially those that come from the Mediterranean region. The San José scale (*Aspidiotus perniciosus*) is viviparous and enormously productive. It lives upon the woody members of the order *Rosaceæ*, for example, apple, cherry, rose, and pear, and upon currants, gooseberries, elm, chestnut, oak, walnut, and many other trees and shrubs. The scurfy scale (*Chionaspis furfur*) is an oval scale with the cast skin at the small end and is frequently found upon apple and pear trees. The red scale of the orange is a close relative of the San José scale and is well known in California, Florida, etc. (See ORANGE.)

The cottony maple scale (*Pulvinaria innumerabilis*) is often found on Virginia creeper, grape vines, and some other plants, as well as on maples. It is a soft scale which is usually rather conspicuous in spring from its cottony appear-

SCALE-TAIL—SCALLOP

ance upon the young growths. The "cotton" is really a gum since it can be drawn out into cobweb-like threads. The black scale (*Lecanium olea*) is another soft scale which is well known to California olive and orange growers.

Several species of scale insects are found in greenhouses and nurseries devoted to ornamental plants. But they present no more remarkable features in life-history or habits than the preceding, and being of somewhat smaller importance need not be discussed specifically.

Where the natural controls seem to be inadequate to cope with the species various artificial methods have been tested to determine their efficacy. But in many instances these are so cumbersome, expensive, dangerous either to plant or operator, and difficult to apply intelligently, that they have been discarded. Spraying and fumigation (see INSECTICIDE) are the principal ones in vogue. But it seems highly probable that in many instances the natural controls would hold the scales in check. Man has, however, not yet discovered these controls except in a few cases and in most of these has not made use of them more than experimentally.

Consult: Smith, 'Economic Entomology' (Philadelphia 1896); Comstock, 'Manual for the Study of Insects' (Ithaca 1895); and numerous bulletins of the agricultural experiment stations and the United States Department of Agriculture.

M. G. KAINS,
Crop Expert.

Scale-tail, an African flying squirrel of the family *Anomaluridae*, distinguished from the true squirrels by dentition and various other peculiarities, and especially by the possession of a series of strong keeled scales at the root of the tail, which seems to serve as an aid in climbing. There are several genera and species, of which the best known is *Anomalurus pedi* of the Gold Coast, which is black and white, and is regarded as a delicacy by the natives. The food and habits are similar to those of the northern flying-squirrels.

Scales, Alfred Moore, American lawyer, soldier, and statesman: b. Reedsville, N. C., 26 Nov. 1827; d. Greensboro, N. C., 9 Nov. 1892. He was graduated from the University of North Carolina in 1846 and admitted to the bar in 1851. He represented Rockingham County in the legislature in 1852, 1853, and 1856, and was a Democratic representative in the 35th Congress 1857-9. When the Civil War broke out, he entered the Confederate army as a private, and was rapidly promoted to the rank of brigadier-general. He took part in many important battles, including Williamsburg, Fredericksburg, Chancellorsville, and Gettysburg, and after the war resumed his law practice at Greensboro, N. C. He was a member of the State Legislature in 1866-7; of Congress in 1875-85; and governor of North Carolina 1884-8.

Scales. See BALANCE.

Scaliger, skāl'j-er, Joseph Justus, French scholar and author: b. Agen, France, 4 Aug. 1540; d. Leyden, France, 21 Jan. 1609. He was the tenth son of his learned father, Julius Caesar Scaliger (q.v.), and received from him a fine classic education, as well as a boastful and arrogant nature. He studied Latin at Bordeaux, and Greek at Paris. According to Henisius, he shut

himself into his room and committed the whole of Homer in 21 days; he memorized the rest of the Greek poets in three months and the entire body of Greek literature in two years. It was his boast that he was equally familiar with 13 languages. In his 22d year he was converted to Protestantism, a fact which probably retarded his advancement in France. From this period until 1578 he traveled extensively, making a poor living from his teaching and writings, but refusing the money offered him by admiring patrons. In 1578 he became professor of belles lettres at Leyden, a position which he held until his death. Joseph Scaliger's most important works are upon chronology. His 'De Emendatione Temporum' (1583) gave the first complete scientific chronology, and for this work, with his 'Thesaurus Temporum' (1609), and on account of his discovery of the Julian Period, he deserves to be called the founder of the science of chronology. He also annotated the principal works of the chief Latin writers.

Scaliger, Julius Caesar, Italian classical scholar: b. Riva, Lake Garda, 23 April 1484; d. Agen, France, 21 Oct. 1558. He is generally accepted as the son of Benedetto Bordonio, a miniature painter of Padua, but Scaliger claimed descent from the Scaligeri princes of Verona, as did his son, Joseph Justus Scaliger. The elder Scaliger, according to his own account, was a page of Emperor Maximilian for 17 years, then received a pension, studied at Bologna, commanded a squadron under the French viceroy, studied natural law, and in 1525 accompanied the bishop of Agen to his diocese in France where he settled, as physician. In 1530 he married a lady of rank and from that time put forth pretentious claims as to his ancestry. He was a man of unusually great learning, a versatile Latin poet, but bold and arrogant, so that while his writings brought him admirers among the scholars of his day, his personal conduct gained him many enemies. His principal works include commentaries on the work of Hippocrates 'De Insamnis' (1538); of Aristotle, 'De Plantis' and Theophrastus, 'De Causis Plantarum' (1566); an attack on Erasmus, 'Oratio pro Cicerone contra Erasmus' (1531), 'De Causis Linguae Latinae' (1540); 'Poetices Libri VII' (1561).

Scallop, a well known bivalve mollusk. The scallops form a family (*Pectinidae*) related to the oysters, which they resemble in having a single adductor muscle. The genus *Pecten*, which in the wide sense is nearly coextensive with the family, has the following characters: The shells are more or less orbicular, with an ear developed on each side of the umbo, making a straight hinge-line, generally ornamented externally with more or less developed radiating ribs. The hinge-teeth are lamellar, but usually small and obscure, the principal ligament is internal and solid, and the muscle-scar is single. The mantle margins are open all around, reduplicated and, besides a fringe of tactile filaments, bear numerous conspicuous eye: of a brilliant blue or silvery lustre. These eyes are the most complex known among the *Pelecypoda* and consist of a nervous layer, a choroid coat, lens and cornea and receive an optic nerve from the circum-pallial trunk. The gills are delicate and of peculiar structure, the foot small and papilliform and in the young has a byssus gland, and the genital ducts open into

SCALP — SCALPING

the kidneys or near their apertures. Only the posterior adductor muscle is present, and this is large, round, central, and remarkable from its constitution in part of striated and in part of nonstriated fibres. Scallops are remarkable, especially when young, for their activity, and swim in a peculiar jumping fashion by opening and powerfully closing the shell valves as though flying, thus forcing out the contained water and propelling themselves forward. As they become older and the shells heavier they are more quiescent. Fully 200 living and a still greater number of fossil species are known beginning in the Carboniferous strata. Perhaps 40 species occur in North American waters, the great majority southward and in moderately deep water. Several of our own and foreign species are of commercial importance, furnishing the well-known scallops of the markets. *P. Jacobæus*, a native of the Mediterranean, is the scallop shell which pilgrims were accustomed to wear in front of their hat in token of having visited the shrine of Saint James at Compostella.

Although the richly colored and beautifully formed shells of the scallops are much used in fancy work of various kinds, these mollusks derive their commercial importance from the use of the muscle for food. Before the advent of the white man they were largely gathered for this purpose by the Indians. The principal fisheries are on the coast of Maine, in Long Island Sound, Buzzard Bay and contiguous waters, and on the coasts of New Jersey and California, the first two having the greatest magnitude. South of Cape Cod *Pecten irradians*, which has the shell marked with about 20 prominent radiating ribs on each side, is the species sought. This lives especially in the shoal waters of the bays or on flats in the Sound. Scallops vary greatly in abundance from year to year and the seat of the fisheries changes accordingly, some formerly favorite grounds being abandoned and others developed. The commercial scallop fishery of Maine originated about 1880 and has since developed into an important industry at many points east of Casco Bay. Here the giant scallop (*P. magellanicus*) is the species sought. This is much larger than *P. irradians*, and the valves are marked with numerous fine radiating lines, the lower valve being nearly flat and white and the upper convex and brown. This species lives in deeper water and like the other changes its feeding ground. Scallops are now taken almost exclusively in small dredges, resembling in most features the oyster dredge, and pulled over the ground by means of small boats; larger vessels when used serve chiefly for transportation, etc. The fishing season varies; south of Cape Cod it covers the cold months, but about Mount Desert the bulk of the catch is made during July and August. All of the scallop fisheries south of Cape Cod yielded about 72,000 gallons in 1880 valued at about \$30,000; those of Maine in 1889 had an output of 30,000, the product of 45,000 bushels of scallops, and valued at \$18,647.

Consult: Ingersoll, 'The Fisheries Industries of the United States,' Sec. V. (Washington 1887); Smith, 'The Giant Scallop Fishery of Maine'; Bull. U. S. Fish Comm. 1889 (1891); Stearns, 'Overland Monthly' (1873).

Scalp, the outer covering or integument of the upper part of the skull or brain-case. Except in the fact that hair in both sexes grows

more luxuriantly on the scalp than elsewhere, the skin of the scalp differs but slightly from ordinary skin. But besides its constituent of skin, the scalp is composed of the expanded tendon of the occipito-frontalis muscle, and of intermediate cellular tissue and blood-vessels. Injuries of the scalp, however slight, must be carefully watched, for they may be followed by erysipelas, inflammation, suppuration, or pyæmia that may easily prove fatal. Prompt antiseptic dressing lessens the danger in such accidents. In the treatment of scalp-wounds no part of the scalp should be cut or torn away; and, if possible, stitches should be avoided, as plasters and bandages will generally keep the separated parts in apposition. Burns of the scalp are very liable to be followed by erysipelas and diffuse inflammation, but the brain is comparatively seldom affected in these cases. Tumors of the scalp are not uncommon, the most frequent being the cutaneous cysts popularly known as wens, and vascular tumors. Parasitic diseases also affect the scalp, and require special treatment. Catarrhal inflammation of the hair-follicle and other hair-destroying diseases result from micro-organisms. See DANDRUFF; PITYRIASIS; RINGWORM; SEBORRHEA.

Scalper, a common term in the United States applied to any person who buys railroad, theatre, or steamship tickets at a discount from people unable to use them, and sells them again at an advance on the price he paid for them. Theatres and transportation companies have devised various plans to break up this trade, and in some States laws have been passed forbidding the sale of railroad tickets at cut-rate prices.

Scalping, the act of partly cutting and partly tearing off the skin of the head, with the hair attached, of a living or a dead victim. Scalping was practised not only by the American Indians, but also, in early times, by most of the savage and barbarous nations of the eastern hemisphere, as the Scythians, Gauls, and other wild peoples of Asia and Europe. Sometimes the entire head was taken in lieu of the scalp. After the scalp was taken, it was tanned and then stretched on a small hoop of wood, and the side opposite to that having the hair was painted in various colors, and even the hair was tinted likewise; sometimes the portrait or the hieroglyphic device of the person scalped was placed on it. Persons scalped did not always die from the effect. Scalps were regarded as trophies of victory and prowess. Joutel relates that in 1687 among the Cenis of Texas, a scalp was waved or offered in ceremony to the four quarters of the world, and that tobacco and hominy were offered to the scalps that were paraded. In 1703, Bienville offered 10 "escus" (écus, about 10 crowns) for every scalp of a man killed or prisoner taken of the Chetimachas and Alibamas (Alibamas). The American colonies offered bounties for scalps. In 1724 Massachusetts offered 100 pounds sterling (about \$500) for Indian scalps; 30 years later, during the so-called French and Indian war, the French offered a bounty for British scalps, and the colonists for Indian scalps. In 1755, 40 pounds sterling (about \$200) was offered by Massachusetts for the scalps of male Indians over 12 years of age, and 20 pounds sterling (about \$100) for the scalps of women and children.

J. N. B. HEWITT,

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SCALY ANT-EATER — SCANDINAVIAN LITERATURES

Scaly Ant-eater. See MANTIS.

Scamander, ska-măn'dér (ancient XANTHUS), Turkey in Asia, a small stream in the Troad, rising near the city of Ilium. It had two sources, one of which was hot, the other cold. Strabo asserts, however, that it had but one source, which was in Mount Ida. Its direction was west-northwest, and about two miles from its mouth it received the small river Simois; it emptied into the Hellespont. Since the beginning of the present era these rivers have had separate courses. The Scamander is sometimes identified with the Menderes or Meander (q.v.).

Scammony, a gum-resin obtained from the *Convolvulus scammonia*, native to the bushy wastes of western Asia. This is a climbing plant with irregularly arrow-shaped leaves, white or purplish flowers like morning-glories, and a fleshy tapering perennial root. When in flower, incisions are made obliquely in the upper part of this root, and shells fastened below the gashes, in which the sap is caught as it exudes. They are then emptied, the juice added to scrapings from the root, thoroughly mixed, dried, and kneaded into cakes. Scammony is much adulterated, but when pure or "virgin" is greenish-gray or blackish in color, internally porous and of a resinous lustre, breaking with an angular fracture and translucent in thin pieces. It has a peculiar somewhat cheeselike odor and an acrid taste. Different kinds of the drug are named after the districts in which it is collected and the place of export. Scammony is a strong purgative usually used in combination with other medicines, and supposed to have been known to the Greeks as early as the 3d century B.C., and to have been one of the medicines recommended by Helias to King Alfred the Great.

Scamozzi, Vincenzo, vên-chënd'zô skä-mô't'sê, Italian architect: b. Vicenza 1552; d. Venice 7 Aug. 1616. He was taught by his father, also an architect, and by Palladio and Sansovino, at Venice; and at Rome he studied ancient monuments. Returning in 1583 he was commissioned to erect a monument to the family of Marc Antonio Barbari, in the church of the Carità, and so much was this work approved that he was appointed to finish the grand library at Saint Mark's, to build the Trissino Palace at Vicenza and the Cornaro Palace on the Grand Canal, Venice. By this time Scamozzi's fame had spread over Europe and he was in great demand. He built the Ravaschieri Palace at Genoa, and added the second story to the Palazzo Strozzi at Florence (1594). About 1604 he designed the Cathedral of Salzburg, Austria, and a part of the Schloss at Prague, Bohemia. His writings include: 'Discourses on the Architecture of Rome' (1582); and 'Ideas of Universal Architecture,' two volumes of which were completed before his death.

Scanderbeg, skän'dér-bëg, Albanian prince: b. 1404; d. Lissa, Albania, 17 Jan. 1468. His real name was George Castriotes, and he was the 4th son of John Castriotes, an Albanian prince. The sons being given to Sultan Murad II. in 1423 as hostages of peace, the sultan named the youngest Iskender Bey (whence Scanderbeg) and made him a janissary after having poisoned his three brothers. When Scanderbeg's father died in 1432 and the sultan annexed Albania as a

province, Scanderbeg determined to revolt. He had gained distinction in the Ottoman campaigns, and his opportunity came when, in 1443, he was sent to Hungary against the Christian Huniadi. He entered into agreement with the latter, gave him the victory, and fled to the sultan's powerful fortress of Croia, of which he gained command as the sultan's representative. Abjuring Mohammedanism, he now organized the Albanian forces and successfully repelled the armies of the entire Ottoman empire for 17 years, when the sultan's successor, Mohammed II., made a treaty with him acknowledging the independence of Albania and Epirus. A few years later he was persuaded by the pope to join the Venetians against the Mussulmans and with an inferior force won eight great victories over Mohammed II.

Scandinavia, skän-dī-nā'vī-ä, a general designation for the three north-European kingdoms, Denmark, Norway, and Sweden (qq.v.), sometimes applied in a more restricted sense to the two latter only. In the Middle Ages the name of Northmen was bestowed indiscriminately on the inhabitants of the three countries, whose closely related languages and common mode of life and political fortunes afforded sufficient basis for considering them one people. As a geographical term Scandinavia is rapidly passing out of use, but the appellation is still employed in an ethnographic, and especially in a literary sense. See SCANDINAVIAN LITERATURES.

Scandinavian Literatures. Danish literature having received adequate treatment under DENMARK, the present account deals only with the literatures of NORWAY and SWEDEN.

Norwegian Literature, in the strict sense, is a very young one, dating back only to 1814, when the political union that had existed for over four centuries between Denmark and Norway was dissolved. Norwegian literature, however, may claim a noble and ancient ancestry in the old Icelandic literature (q.v.), which may justly be regarded as an offshoot of that of mediæval Norway, an offshoot which flourished luxuriantly while the parent stem failed to develop any marked growth of its own. Traces of a Norwegian literature appear in the middle of the 13th century in the form of prose translations from the body of chivalric and legendary tales then so popular throughout Europe, as for example the Charlemagne cycle and the story of Dietrich of Bern. With the union of Norway and Denmark in 1387 all independent literary expression in the former country disappears, and whenever men of Norwegian birth attain eminence, it is as contributors to the Danish literature. Such men were Petter Dass in the 17th century and later, Holberg, Wessel, Tullin and Frimann among others. The national spirit, however, remained in full vigor in Norway, and in the mouths of the people the ancient vernacular was preserved, destined to serve as a factor in the development of a new Norwegian literary dialect in the 19th century. In 1774 the Norwegian Society was organized at Copenhagen and its influence, without directly aiming at such an object, came to serve as a source of encouragement for those writers in Danish whose themes dealt with Norwegian nature, life, or modes of thought. With the separation of Norway from Denmark in 1814

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begins the national period of Norwegian literature. For some twenty years following that event, the literary productions of the kingdom were marked by a fervidity of patriotic enthusiasm which revealed itself in unmeasured exaltation of the Norwegian land and the Norwegian people, to the great detriment of formal excellence or the development of critical standards. The best known names of this period are M. C. Hansen (1794-1842), H. A. Bjerregaard (1792-1842), and C. N. Schwach (1793-1860). A great advance is marked by the poems of Henrik Wergeland (1808-45), the great national poet of Norway, in whom love of country was more than mere fantastic adulation of its rocks and gorges. Yet Wergeland, too, was carried away by his patriotism to the extreme of denying foreign standards of form and taste. In this position he was assailed by the critic and poet Welhaven (1807-73), who stood for the imposition of approved literary form on the raw matter of national feeling. The contest between the two assumed national importance and split up the intellectual world of Norway into two hostile camps. Welhaven's principles, however, triumphed in the end, as indeed they were bound to do, when with the progress of time cooling national ardor gave way to increasing artistic skill, growing with practice. A. Munch (1811-84), in addition to his dramas and prose works, deserves mention as a writer of gentle and pious verse, marked by a high development of form. Camilla Collett, a sister of Wergeland, was the author of a still extremely popular novel, 'The Magistrate's Daughters.' A period of comparatively mediocre production follows, in which the most prominent names are P. C. Asbjørnsen (1812-85) and Jørgen Moe (1813-82), who jointly published in 1842 a collection of popular myths and traditions which was instrumental in stimulating interest in the folklore; Landstad, Bugge, and Lindemann, who gathered the popular songs of the country; Schulze, Ostgaard, and Meltzer, who depicted various aspects of the national life with a high degree of power; and Aasen, who originated the movement for making the popular dialect the basis of a written language. The chief writers among Aasen's followers, were the epic and lyric poet, A. O. Vinje and K. Janson, who wrote verse, prose, tales, and drama.

The greatest era in the history of Norwegian literature is the latest, when with the works of Henrik Ibsen (q.v.), and Bjørnstjerne Bjørnson (q.v.), Norway passes at once from a minor place among the nations of Europe to a prominent position in the front rank of the world's literature. Ibsen and Bjørnson both make use of a vernacular consisting of a blending of literary Danish with the popular Norwegian. The common spirit of this latest phase of the national literature is that of a realistic radicalism which directs its efforts to the thorough exposition of the evils of modern society and the anomalies of the human character and of human civilization. This spirit finds its greatest exponent in Ibsen. In Bjørnson a deep religious feeling turns the lesson of realism to a belief in an ultimate good. Jonas Lie has painted with a light touch the domestic life of the people, while Alexander Kielland and Arne Garborg have devoted their attention to social questions, their writings par-

taking largely of the nature of literature "with a purpose." Outside of belles-lettres, the Norwegian literature contains able monuments of historical and scientific research. In history P. A. Munch and R. Keyser were the pioneers. They laid the foundations for the scientific study of the old history of Norway and were followed by J. E. Sars (the ablest historian the country has as yet produced), G. Storm, N. Nicolaysen, and L. Daae. E. L. Sundt (1817-75) occupies a very prominent place in the field of political economy, and N. Treschow (1751-1833) in that of philosophy. In philology and literature excellent work has been done by C. R. Unger, J. Fritzner, and S. Bugge. See Botten-Hansen, 'Norvège littéraire' (1867); Horn's 'History of the Literature of the Scandinavian North,' tr. by Anderson; Schweitzer, 'Geschichte der skandinavischen Litteratur' (1886-9); 'Die Entwicklung der nationalen Dichtung in Norwegen' (1881).

Swedish Language and Literature.—The Swedish belongs to the Scandinavian branch of the Germanic family of languages and with Danish forms a subdivision of that branch sometimes called the East Scandinavian in distinction from the West Scandinavian, which comprises Norwegian and Icelandic. The basis of both divisions was the old Danish language, which entered upon a course of differentiation about the middle of the 9th century, since when the development of the Swedish language has been usually divided into five periods: the first to 1250 marked by some scanty remains in the Runic alphabet; the second to 1400, exemplified in a number of legal codes, comprising the 'Vestgötalag,' the 'Östgötalag' and the 'Gutalag'; the third to 1520, a period of Danish and German influence during which the literary language underwent an important evolution, and the chief monuments of which are sundry historical chronicles; the fourth to 1700, during which the Reformation and the introduction of printing hastened the differentiation between Swedish and Danish, resulting at the end in the assumption by the language of what has remained its distinctive character; the fifth period, to the present day. Swedish has retained to a greater degree than any of the sister languages, excepting of course Icelandic, the peculiarities of the old Scandinavian common tongue. It is rich in terminal endings and is by far the most euphonous of the northern languages. Consult Noreen, 'Altschwedische Sprachen' (1897); 'Geschichte der nordischen Sprachen' (1898).

The oldest remains of Swedish literature are in the form of Runes, which, though scanty in number, would seem to indicate that the country possessed a considerable body of legends and hero-tales in verse form at a comparatively early time. With the introduction of Christianity the ecclesiastical factor becomes the dominant one, and the works produced follow as a rule Latin sources and models. The greater part were in the form of translations for the use of the national clergy, and in this connection the cloister of Vadstena founded by St. Birgitta (1303-73) is famous. There portions of the Bible were translated and collections of legends of the saints made. Outside of the religious sphere, the romances of chivalry attained great popularity. The chronicles of the time possess little histor-

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ical value with the exception of the 'Historia' of Olavus Magnus, which gives a faithful description of the peoples of the north; of more interest are the various codes of laws mentioned above. The religious element continued prominent throughout the period of the Reformation; the best known names during this time being that of the reformer Olavus Petri, who translated the New Testament (1526). His brother, Laurentius Petri, edited the whole Bible in 1541, and wrote an excellent history of Sweden. Olavus Petri also wrote the first mystery play, 'Tobiæ Comœdia' (1550), but was surpassed in the growing field of the drama by Messenius. The Thirty Years' War, in making Sweden the great power in the north of Europe, subjected her literature to foreign influences, and Italian, French, and German models were zealously imitated. A definite classical tendency also becomes apparent and an attempt is made to assimilate ancient standards with the native genius of the language. The greatest name of this period is Stjernhjelm (1598-1672), who wrote didactic verse, odes, and lyrics, more formal than inspired, and in spite of his prevailing classicism fell, to some degree, under the Romantic influence. His followers, Samuel Columbus (1642-79) and Hjærne (1641-1724), carried on the work of introducing foreign metres and verse forms into the language. Rosenhane (1619-84) cultivated the sonnet successfully, and Runius (1679-1713) attained exceedingly great popularity as the facile author of merry-hearted verse. In the beginning of the 18th century the influence of the French pseudo-classicism was considerable; it encountered a rival tendency, however, in the rise of a passionate study of Norse antiquities, carried by Rudbeck to absurd lengths in his 'Atlantica.' Archæology now gave way to science, which, with the speculative branches to a minor degree, quite overshadowed pure belles-lettres. This is the age of Linnæus in botany, of Celsius in astronomy, of Polhem in physics, and of Scheele in chemistry. Dalin laid the beginnings of historical study, and Ihre and Hof did pioneer work in the field of philology. In the realm of pure thought the figure of Swedenborg (q.v.) overshadows all others. In fine literature Fru Nordenflycht was the centre of a circle that numbered among others, Creutz, author of the idyllic poem, 'Atis och Camilla.' The age of Gustavus III. (1780-1809) was marked by the preponderating influence of French rationalism; the cultivation of the sciences languished, but letters made great progress. Kellgren (d. 1795) was a master of poetic form and embodied in his verse the humanitarian ideas of the later 18th century. In contradistinction to Kellgren's classic muse, Bellman (d. 1795) was essentially Swedish in his light verse dealing with the pleasures of life, reminding one not a little of what is best in Bengt Lidner (d. 1793), combining broad sweep of thought with a vitiating excess of sentimentality. Not less subject to the French influence were Gyllenborg (died 1808), who wrote epics and fables, and Oxenstjerna (d. 1818), who during his lifetime enjoyed great popularity.

With the second decade of the 19th century begins a decided reaction against the pseudo-classic traditions of France. The party of

Phosphorists, representing the extreme of Romanticism, now gains the ascendancy, and its most gifted member Atterbom (d. 1855) embodied, in the finest examples of lyric verse the Swedish literature possesses, the very essence of dream life and idealistic aspiration. Palmblad and Dahlgren were stout enemies of classicism, and the latter in his verse produced fine examples of that nature description to which the Romanticists turned to find the reflection of their own moods. Coeval with the Phosphorist Society was the Gothic League, which included among its members Tegnér (q.v.), Geijer (q.v.), and Ling. The Goths turned their attention to the legends and history of the ancient Northland, and Geijer's stirring lyrics and ballads have become a cherished part of the national literature. Tegnér attained the culmination of his genius in the 'Frithjofs Saga,' wherein the old material is treated in the spirit of modern romanticism. Almqvist (q.v.) brought a weirdly fertile imagination to the treatment of life's realities and, dying in 1866, anticipated in many ways the problems and contentions of the naturalists and realists of the last two decades of the century. Malmström (d. 1865) and Böttiger (d. 1879) were the chief representatives of a school which sought to combine the spiritual grasp of the Phosphorists with the simple technique of the Gothic writers. In Runeberg (d. 1877) Finland gave to Swedish literature its greatest poet since Tegnér. Runeberg excelled also in the drama and became the model for a school of writers comprising, among others, Nervander, Stenbäck, and Cygnäus, which has sought to portray the realities of simple life in a simple, though sympathetic, manner. Fredrika Bremer (q.v.) is the best known representative of a school of sentimental novelists which flourished about the middle of the 19th century and has now all but disappeared. Realism is now the dominant tone in Swedish literature, and the influence of the French naturalists and to a greater extent even of the Norwegian masters is apparent. At the head of the realists stands August Strindberg (q.v.), dramatist, novelist, and miscellaneous writer, whose active career began with the publication of 'The Red Room,' a study of Bohemian life, in 1879. With the name of Rydberg, one of Sweden's most gifted poets, the account may be concluded, if we only cast a backward glance to speak of Geijer and Fryxell, the two greatest names in the field of Swedish history. Consult Schweitzer, 'Geschichte der skandinavischen Litteratur' (1886-9); Wollheim da Fonseca, 'National Litteratur der Skandinaver' (1874-7); Anderson's translation of 'Horn's History of the literature of the Scandinavian North' (1901).

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Scandinavian Music. Until the 19th century the Scandinavian countries showed no national schools of composition, though the history of music in these countries goes back for nearly four centuries. In Denmark Hartmann (1805-1900) is regarded as the founder of an indigenous school, and the list of great names includes Gade (1817-90), Emil Hartmann (1836-98), and Wending (1835-99). In Sweden Germans were the first composers, the native successors beginning with Benvold (1796-1868)

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and continuing in Lindblad (1801-78), Södermann (1832-76), Hallén, and Sjögren. In Norway Kjerulf (1815-68) was the first of native composers. Svendsen, Grieg, and Sinding form a notable triad in the national development.

Scandinavian Mythology. The mythology of Scandinavia was distinct from that of ancient Greece and Rome, although both systems resembled each other in certain essential features, and they may possibly have had a common origin in the far-off prehistoric period. The differences were such as might be expected to exist between a nation cradled in the frozen North and nations living in the genial South. In the Scandinavian as in Greek mythology, there are two periods, the prior one apparently reflecting misty traditions of the earth's development from chaos and darkness into order and light, perhaps stories which the cave-man had handed down to his children and they to their children, until they became crystallized into an ideal system of supernatural beings by the Vikings, who afterwards invaded and conquered the Scandinavian countries. Geology has strangely verified the facts which were dimly shadowed forth in the early Northern mythology. The terrible ice age which converted Europe into an arctic waste, and pushed its awful precipices into the Atlantic beyond the Hebrides and the western coast of Ireland, evidently made an indelible impression on the mind of prehistoric man, who learned to regard ice as the deadly enemy of human existence, and the sun, with its vivifying heat, as the source of happiness and joy. This thought, almost a second nature, is reflected in the earlier mythology of the Scandinavian race, in its shadowy and crude mind-picture of something that had really happened, and that, it was feared and believed, might and would happen again.

The second and younger period of Scandinavian mythology reflects a new era. Men have got over their old dread of an ever imminent catastrophe. They have battled with nature, and found themselves often victorious. They have had heroes of their own, sharing their loves and revenges, triumphing in war, and enjoying the rewards of valor and virtue. Nor were their women unwarlike, as became the daughters of heroes. The Amazons, real or imaginary, of Grecian story, had their counterparts in the lore of the North. A new mythology grew out of new conditions, different from, yet linked with, the old, from which it was a natural evolution, and it is with this younger mythology, its gods and goddesses, that Christianity was brought into contact, ultimately crushing it out after a struggle which proved the deep attachment of the Northmen to their ancient faith.

It is to be said for Scandinavian mythology that it never descended to the sensuousness of Greece and Rome, and was equally superior in breadth and imagery to the absurd polytheism of Egypt. It was terrible in some of its ideals, but never depraved. It imaged the spirit of the Viking race, and was well calculated to inspire them to the deeds of prowess which brought to their feet even the militant races that had founded kingdoms on the ruins of imperial Rome.

According to the earlier Scandinavian mythology there was originally no heaven and no earth, but a vast deep, a world of mist in the North called Niflheim, a fountain which was called Hvergelmer that flowed from the mist, and 12 rivers that issued from the fountain. These rivers froze into ice and filled the deep—a picture of the ice age. The world of fire and light was in a southerly direction, and was called "Muspelheim." The light and heat from the world of fire melted the ice from the world of mist, and from the melted drops sprang the ice-giant Ymer. A little man and woman proceeded from Ymer's left arm, and a son from one of his legs, and these were the ancestors of a race of ice-giants. A cow also came into being from the ice and heat, and gave milk to the giant Ymer, at the same time keeping itself fed by licking salt blocks of ice. One evening while the cow was licking the blocks, human hair grew out of them; on the following day a head, and on the third an entire man who was called Bure. Bor, the son of Bure, married Bestla, the daughter of the giant Bolthorn, and they had three sons, Odin, Vile, and Ve. The sons of Bor slew the ice-giant Ymer. From his body they created the heaven and the earth. His flesh became earth; his bones rocks; his teeth and pieces of his jaws became stones; his hair, grass and trees, and his blood the sea and rivers. His skull was used to make the sky, which was extended over the earth, with four dwarfs, Austre, Vestre, Sudre, and Nordre, representing the East and West, South and North, at the four ends. Out of the heat and light from Muspelheim they made stars, which they fixed in the heavens to give light to the earth. Ymer's brain became clouds. From two ash-trees were created a man, Ask, and a woman, Embla, who were endowed with reason, language, hearing, and sight. The tree of the world called Ygdrasil, stood over the well of time, with its top above the heavens, and three great roots, one among the gods, another among the giants, and the third in the lower regions. The fountain of wisdom and the sacred fountain flowed forth near the roots. By the sacred fountain the gods held their councils, and from this and the fountain of wisdom sprang three beautiful maidens, the Norns, similar to the Fates of Greece and Rome. The Norns were Urd (the Past), Verdande (the Present), and Skuld (the Future). The Norns decreed the fate of men, and gave them aid or punishment as they deserved. The gods dwelt in Asgard, in which was Gladsheim, the hall of gladness. The giants dwelt in Jotunheim and men in Manheim.

Nature-worship came in more distinctly with the later Scandinavian mythology. Odin, ruler of the universe, the Jupiter of the North, and his wife, Frigg, have for sons Thor, the god of thunder; and Balder, the god of justice and of eloquence; and Balder is father of Forsete, god of harmony. Njord, god of winds and of commerce, is father of Frey, who gives rain or sunshine, abundance or famine, to mankind, and of Freyja, who is goddess of love, but also, far different from the Grecian Venus, a model of womanly goodness and wifely devotion. Other gods and goddesses there are, most of them beneficent, and representing the better qualities

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of heart and conscience; all of them superior to the generally dissolute throng of immortals who sat in the court of Olympus when they were not engaged in some intrigue on earth.

The system was not without its terrors, however, its monsters who personified evil and presided over the doom of those debarred from happiness above. The malignant Loke was father of Hel, goddess of the infernal regions, and from whom is derived the name by which they are designated in the English tongue. She dwelt in Helheim, the hall of grief, with hunger for her table, and disease for her bed. There the prisoners of fate led a dark and cheerless existence, in marked contrast to the delights of Asgard.

Scandinavian mythology dealt also with the future of the world and of humanity, and here again it is remarkably in accord, in some of its features, with the teachings of science, and it may be added also of religion. Heaven and earth are to pass away. The end will be preceded by great wars, severe winters, destructive storms, and a covering of the face of the sun. The wolf Fenrer will devour the earth, and giants will make an attack on heaven. The gods will perish. Then there will be a new sun; the earth, rescued from the jaws of Fenrer, will exist again, and a human pair, saved from the general destruction, will renew the human race.

Such was the faith of the fathers of that race which settled Normandy and conquered England, which gave rulers to Muscovy and Sicily, and guardians to the degenerate heirs of the Constantines—the race from which the English-speaking peoples of to-day are largely descended, and from which some of their most valuable qualities are derived. Consult Anderson's 'Norse Mythology' and Rydberg's 'Teutonic Mythology' translated by Anderson.

RASMUS B. ANDERSON,
Author of 'Norse Mythology.'

Scan'dium, in chemistry, a rare metallic element discovered by Nilson (1879) in the mineral euxenite; symbol Sc; atomic weight 44.1. It is of special interest because its existence and properties were deduced theoretically by Mendeleef from his periodic system of the elements. He called the to-be-discovered element ekaboron. As Nilson's Scandium showed exactly the same atomic weight and chemical properties foretold by Mendeleef it is a further proof of the value of the Mendeleef hypothesis. Scandium occurs in very small amounts in the minerals euxenite, gadolinite and yttrite. It forms a white oxide Sc_2O_3 and a number of salts related to the same. The salts are colorless and have a rather acid astringent taste.

Scan'lan, Lawrence, American Roman Catholic bishop: b. Tipperary, Ireland, 28 Sept. 1843. He is the son of Patrick and Catherine Scanlan and was educated at All Hallows College, Dublin, where he was ordained priest in 1868. Coming to America, he was assistant at Saint Patrick's, San Francisco, Cal., 1868 to 1870, and at Saint Mary's Cathedral in that city for the two years following. In the end of 1871 he was sent to Pioche, Nev., where he built the first church in the section; in 1872 to Petaluma, Cal., in 1873 to Salt Lake City, Utah, where he was first pastor for Utah Territory and then vicar

forane. He was so successful in his management of church finances in Salt Lake that he cleared the church of debt and raised a sum sufficient to purchase a large tract of land, on which he built an academy. This kind of work he followed until 1887, building churches and schools and, in 1886 founding the college of All Hallows, in Utah. On 25 Jan. 1887, he was appointed bishop of Lavenden, *in partibus* and apostolic vicar of Utah. On 29 June 1887 he was consecrated at St. Mary's Cathedral, San Francisco, by Archbishop Riordan, assisted by Bishops O'Connell and Manogue. He became the first bishop of the diocese of Salt Lake, Utah, 30 Jan. 1891.

Scan'nell, Richard, American Roman Catholic bishop: b. Cloyne, County Cork, Ireland, 12 May 1845. He was educated at the College of Middleton, Cork, and at All Hallows College, Dublin, at which latter place he was ordained priest, 26 Feb. 1871. He came to the United States the same year and was appointed assistant in Saint Mary's Cathedral, Nashville, Tenn. He served successively at Saint Columba's church, and as pastor of Saint Mary's Cathedral, 1871-85, being administrator of the diocese of Nashville, 1880-3; and as pastor of Saint Joseph's church, West Nashville, which he organized, 1885-7. On 9 June 1887 he was appointed bishop of the diocese of Concordia, Kan., and was consecrated in Saint Mary's, Nashville, 30 Nov. 1887, by Archbishop Feehan, assisted by Bishops McCloskey and Rademacher. Upon the death of the Rt. Rev. Jas. O'Connor he was transferred 30 Jan. 1891 to the diocese of Omaha.

Scansores, skän-sö'rëz, an obsolete order of birds represented by cuckoos, woodpeckers, parrots, toucans, and trogons and the like, popularly known as that of the "climbing" birds, and distinguished primarily by the fact that the toes are directed two forward and two backward. It was an artificial group, whose members have been scientifically re-classified in the *Coraciiformes* and other groups. Compare NATATORES.

Scape-goat, a goat which according to the Mosaic law, was sent into the wilderness, on the Day of Atonement, bearing the sins of the people. Under later Jewish practice the goat was thrown over a precipice about 12 miles from Jerusalem. Hence the term "scape-goat" is applied to any person who is made to suffer for the wrong-doing of others.

Scaphop'oda, a class of *Mollusca* of a low type, known as fossils from the Devonian to the present, and surviving in only a small number of forms, typified by the tusk-shells (*Dentalium*). The head is rudimentary, the mantle-edges ventrally concrescent, forming a tube opening before and behind, and covered with a slight-curved shell shaped like an elephant's tusk. The body has its dorsal side toward the concave side of the shell, and is attached to the shell by muscles near the posterior or pointed end. The foot, which can be protruded from the anterior or wider aperture, is rather long, pointed, and has sometimes two lateral lobes. All are marine, and some species live in very deep water. Consult Cooke, 'Mollusca' (London and New York, 1895).

SCAPOLITE — SCARBOROUGH

Scap'olite, the name of an important group of rock-forming minerals, including the species meionite, wernerite, mizzonite, marialite. Of these minerals wernerite (q.v.) is by far the commonest. All the species of the group crystallize in the tetragonal system and are hemihedral. Their color is generally white, gray, or flesh-red; hardness 5 to 6.5; specific gravity 2.57 to 2.74. They are all silicates of aluminum, calcium, and sodium; chlorine is also often present. Their composition has been explained by Tschermak by placing meionite at one end of the series with a typical formula of $\text{Ca}_2\text{Al}_2\text{Si}_2\text{O}_{10}$ and marialite at the other end with a typical formula of $\text{Na}_2\text{Al}_2\text{Si}_2\text{O}_{10}\text{Cl}$, and assuming that wernerite and mizzonite are isomorphous combinations of these two compounds in varying proportions. The scapolites are thus an interesting group of minerals similar to the feldspars in their formation of a series of compounds gradually varying in composition, the silica, soda, and chlorine increasing as the alumina and lime decrease. Scapolites occur abundantly as primary minerals in Archæan rocks in limestone and gneiss; meionite occurs in the volcanic rocks of Vesuvius, but with this exception, the scapolites occur in eruptive rocks only as secondary minerals, being products of the alteration of feldspars.

Scap'ula. See ANATOMY; OSTEOLOGY; SHOULDER-GIRDLE.

Scap'ular, or **Scapulary**, an article of attire worn over the shoulders (*scapula*) by the inmates of monastic houses. Originally, in the Benedictine Order, it was worn over the regular monastic dress by the brethren when engaged in manual labor, but it is now part of the ordinary habit of the older religious orders, whether of monks or of friars. The word, however, its now commonly used to signify a sort of emblematic scapulary, consisting of two small squares of cloth held together by strings, from which the pieces of cloth are suspended so that one square reaches to the breast and the other to the back at the shoulder blades of the devotee who wears the scapular. There are several different kinds of these scapulars, to the wearing of which are attached sundry obligations and sundry spiritual privileges, such as indulgences, participation in the merits and the prayers of their fellow-members of a scapulary confraternity, etc. These miniature scapulars were brought into use in the 13th century by Saint Simon Stock, an Englishman and general of the Carmelite Order.

Scar-tattooing. See TATTOOING.

Scarabæidæ, skär-î-bē'î-dē, an exceedingly large family of beetles, including the most gigantic forms, although some of the species, as the chafers, dung-beetles, etc., familiar in the United States and Europe, are of moderate or small size. They have the terminal segments of the feelers in the form of flattened plates, producing a comb-like club; and, unlike those of their relatives, the *Lucanidæ*, these plates can be brought closely together so that the club appears compact. These antennal plates are relatively larger in the males than in the females. The pronotum, especially in the males, is often ornamented with conspicuous and curiously shaped horns as in the rhinoceros beetle (q.v.), whose purpose is unknown. In structural detail and habits the members of this family differ widely among themselves. Some are dung-

feeders, and certain American species roll together balls of dung wherein they lay their eggs, thus providing food for their grubs. Very many feed on plants, the beetles eating leaves, and the grub roots. The grubs are white and fleshy, usually bent into a semicircle; the large head has powerful mandibles and no ocelli; the body-segments are often transversely wrinkled, and the hindmost segment is often greatly swollen. Some of the *Scarabæidæ* are dull black—the dung-beetles for example; while others are of bright metallic hues. The family ranges all over the world, but is most abundant in tropical countries. A typical example of the group is the sacred beetle of Egypt (see SCARABS), whose carved images are called scarabeids.

Scar'abs, representations of the sacred beetle found on Egyptian gems, coins, mummies, obelisks, and works of art. The appearance and rapid multiplication of beetles in the mud left on the subsidence of the Nile gave rise to the belief in their spontaneous generation, and they became the symbol of creation, and creative power. In their circular shape and the bright, golden tints of their wing-cases they were thought to resemble the shape and lustre of the sun, and thus were taken to be one of the forms under which the sun-god appeared. Accordingly, scarabs were cut in stones and employed as seals and amulets. They were bored through their length so that they could be strung like beads, and easily worn on the person. After the commingling of the Egyptian with other races, Gnostics and Christians interpreted the meaning of these gems in accordance with their own religious systems. Those of the most ancient period, such as are found on mummies, are inscribed with the names of the kings held in highest veneration, Thutmosis III., Rameses II., and Amenophis III., and frequently with some hieroglyphic symbol. The larger of them have some short religious or historic inscription on their under side. Consult: Petrie, 'Historical Scarabs' (1889); Myer, 'Scarabs' (1894).

Scaramouch, skär'a-mowch, one of the grotesque characters of the Italian stage, who was dressed entirely in black, wore a mask, and represented the swaggerer and poltroon. In France the scaramouch was used for a greater variety of parts.

Scarborough, skär'bū-rō, John, American Protestant Episcopal bishop: b. Castletwellan, Ireland, 25 April 1831. He came to the United States when very young, was graduated from Trinity College, Hartford, in 1854, from the General Theological Seminary in 1857, and was ordained to the priesthood in 1858. He was assistant rector of Saint Paul's, Troy, in 1857-60, rector of the Church of the Holy Comforter, Poughkeepsie, N. Y., in 1860-7, of Trinity Church, Pittsburg, Pa., in 1867-75, and in the last-named year was consecrated bishop of New Jersey.

Scarborough, William Saunders, American educator: b. Macon, Ga., 1852. He was graduated from Oberlin in 1875, studied at the Theological Seminary there, and has since occupied various chairs at Wilberforce University, of which he is vice-president. He is of African descent and is actively interested in the education and upliftment of his race. His publications include: 'First Lessons in Greek' (1881):

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'Our Political Status' (1884); 'Birds of Aristophanes' (1888); etc.

Scarborough, England, in the county of York (North Riding), popularly known as "The Queen of English Watering Places," is on the North Sea, 39 miles northeast of York. The main part of the town is on the south bay, and rises in successive terraces; the new quarters are divided from the older by a deep ravine crossed by two bridges. The modern period of the town dates from the discovery of mineral springs in 1620. The Grand Hotel, on Saint Nicholas Cliff, is one of the largest in England. There is a fine aquarium, a museum—a Roman-Doric rotunda—a mechanics' institute, and the Spa and its grounds are attractive features of the place. There are fine promenades. The People's Park occupies both sides of the valley. Fishing and the manufacture of jet ornaments are the chief occupations.

Scarey Creek, Engagement at. On 2 July 1861 Gen. McClellan, then preparing to advance from Buckhannon against the Confederate forces under Gen. Garnett at Rich Mountain, ordered Gen. Cox to move with one brigade from Camp Dennison, Ohio, cross the Ohio River at Gallipolis, and operate in the Kanawha Valley, the object of the movement being to secure McClellan's right flank and to prevent Gen. Wise from reinforcing Garnett at Rich Mountain. With three regiments Cox arrived at Gallipolis, where he was joined by another regiment, and on the 10th crossed the river to Point Pleasant, where he received orders from McClellan to drive Wise from the Kanawha Valley. Cox went up the Great Kanawha on steamboats, and at the mouth of Scarey Creek, on the south side of the river, found his passage disputed by a force of 200 men, with two guns, under command of Col. Patton. It was necessary to dislodge Patton, whose two guns commanded the river. A small body of Cox's command had reconnoitered the position, and awaited the arrival of Cox's main body, which came up on the 16th. Cox landed on the north side of the river, and on the 17th Col. Lowe, with the 12th Ohio, two companies of the 21st, and some cavalry, in all 1,020 men and two guns, was landed on the south side of the river and advanced upon Patton, reaching the bank of the creek about 3 P.M. The two guns were put in position and the cavalry advanced, but were speedily driven back by the Confederate guns. The artillery now opened on both sides and, after some sharp firing, Patton's men were seized with a panic; but reinforcements coming up, they were rallied, and the Confederates advanced and took position along the bank of the creek, across which there was quite a severe contest. A small Union force was sent across the creek to turn the Confederate left and seize their guns; but, not waiting for this movement to develop, the main body charged across the creek and drove the Confederates up the hillside, back upon their guns, and another panic ensued. But more reinforcements coming up, the Confederates rallied and poured such a telling fire into the advancing Union line that it fell back in disorder, leaving dead and wounded on the field, recrossed the creek, and continued the retreat. The Union loss was 2 officers and 12 men killed and 47 men wounded; the Confederate loss 1 officer and 4 men killed, and 9 wounded. Two colonels, a

lieutenant-colonel, and two captains of Cox's command, whose regiments were not engaged, but who were led by curiosity to see a fight, left camp on the north side of the river and were taken prisoners. This check delayed Cox's advance up the river several days, until he could get land transportation. Consult 'Official Records,' Vol. II.

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Scar'idæ, a large family of fishes, represented by the parrot-fishes, which occur in all warm seas, lingering about coral reefs and weedy rocks. Few species are of any value as game or for food, but some are utilized in the West Indies and Hawaii. See **ICHTHYOLOGY**.

Scarlatti'na. See **SCARLET FEVER**.

Scarlatti, skär-lät'tè, **Alessandro**, Italian composer: b. Trapani, Sicily, 1659; d. Naples, Italy, 24 Oct. 1725. Appointed maestro di capella by Queen Christina of Sweden, he wrote his first opera for performance in her palace. He produced his first oratorio 'I Dolori di Maria sempre Vergine,' in 1693, and was then appointed maestro di capella to the viceroy at Naples. He held the position of chapel-master at Santa Maria Maggiore, Rome, 1707-9, and then returned to Naples. Scarlatti was possessed of great fertility of imagination. In method he opposed the enemies of the counterpoint, being considered the greatest contrapuntist of his age, and the inventor of accompanied recitative. His compositions, few of which have been published, included 115 operas, 200 masses, 9 oratorios, 500 cantatas, and miscellaneous minor pieces. Three of his operas, 'Geroue'; 'Il Flavio Cuniberto'; and 'La Teodora Augusta,' preserved in the original MSS. are at Christ Church, Oxford, England, and another is in the British Museum.

Scarlet Grain, a dye-stuff consisting of coccid insects allied to cochineal. See **Coccus**.

Scarlet Fever, or **Scarlatina**, an acute infectious disease of unknown origin, characterized by a rapid onset of fever, general symptoms of poisoning, and later by the appearance of a typical rash. The disease was not definitely described until the latter part of the 16th century, although an occasional case is suggested in literature before that time. Epidemics ravaged Europe for 150 years before the disease made its appearance in America; this was in Massachusetts in 1735; and the disease then spread all over New England and the rest of North America. Not until 1830 did it get a foothold in South America, but since that time epidemics have been widespread and frequently very malignant.

In spite of laborious researches, the causative agent has as yet eluded detection. In every case the micrococci are apt to be very active and productive of some of the symptoms, but there appears to be another agent responsible for certain peculiar features of the disease. This has recently been described as a protozoon, the form of micro-organism that causes malaria; but as yet the observation has not been verified. The disease is transmitted directly from one individual to another, or through articles which have been in the sick-room, such as clothing, bedding, paper, pictures, and particularly those substances from which infectious material is not readily dislodged. The virus is not killed by cold, but dry heat, steam, and gases such as

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formaldehyde or chlorine will destroy it after a comparatively short exposure to their action. The contagion is given off in the discharges of the nose and throat, in the vomit, in mother's milk, and in the desquamated skin. It may also be carried in the milk-supply, as animals are liable to the disease. It occasionally happens that the disease is transmitted before the appearance of the rash, but the most contagious period is after the onset of desquamation. The young are particularly liable to the disease. One attack usually protects the individual for life.

The period of incubation lasts from two to seven days, and occasionally longer. The onset is usually sudden and active, the patient appearing very sick and dull, complaining of sore throat and general pains throughout the body. Severe and persistent vomiting ushers in the attack. The temperature rises rapidly, reaching 103° or 104° F. in the first 24 hours. These symptoms constitute the prodromata, lasting from 12 to 36 hours; at the end of which period the rash appears, first on the front of the neck and chest, and gradually spreads over the entire body in two or three days. This rash is a diffuse blush of brilliant scarlet hue, showing tiny elevations of a deeper color scattered through the general redness. The temperature and severity of the disease increase until the rash is all out, then gradually subsides, the temperature reaching normal about the tenth day. The tongue shows similar elevations to those described on the skin, and hence is described as "strawberry tongue." The throat presents a general intense redness of the pharynx, palate, and tonsils, with sometimes small white spots, or considerable patches of false membrane of a pearly white appearance. Desquamation begins about seven days from the appearance of the rash, and the parts that are first affected are the first to desquamate. The process continues until the entire skin of the body is shed. At first the desquamation is in the form of tiny particles, but after it has continued for a few days the skin begins to peel off in large flakes, sometimes even the entire skin of the hand or foot being shed in one piece. This process is not completed in less than ten days, and may take over six weeks, the skin between the toes and fingers being the last to peel. There may be an entire second desquamation, but it is doubtful if this ever carries contagion. The popular belief that the disease is more serious to adults than to children does not seem to be warranted by the observation of eminent authorities.

The complications of scarlet fever are common and frequently very serious. From the throat germs may pass through the Eustachian tubes to the ears, causing inflammation there. The lymphatic glands of the neck may be enlarged by the poison passing through them, and sometimes they suppurate. Inflammation of the joints having all the characteristics of rheumatism is very common; and affections of the heart may follow this rheumatic complication. There is probably more or less affection of the kidneys in all but the very mild cases, but in some the inflammation of the kidney structure is so severe that the picture of acute nephritis is paramount. (See KIDNEYS.) From such inflammation the patient may entirely recover, being left with normal kidneys, or he may succumb because of their impairment; or, again,

the kidneys may be left permanently changed; this last condition being particularly apt to occur when the inflammation sets in late in the disease or during convalescence. Ordinary cases of scarlet fever are seldom fatal if the complications referred to are absent.

The diagnosis, before the appearance of the rash, is suggested by the rapid onset of the symptoms, the intensely red throat, and the persistent vomiting. The prolonged period of fretfulness, watery eyes, and running nose of measles does not occur in scarlet fever; and, differing from that of scarlet fever, the desquamation of measles is bran-like. If a membrane is formed in the throat, it may be necessary to resort to bacteriological examination to distinguish between diphtheria and scarlet fever. There are many drugs which may cause a rash, closely resembling that of scarlet fever; among them, carbolic, benzoic, boracic, and salicylic acids, salol, alcohol, antipyrin, phenacetin, arsenic, mercury, potassium chlorate, quinine, sulphonal, belladonna, hyoscyamus, copaiba, cubebs, rhubarb, strychnine, and various ptomaine poisons. The rash caused by these substances comes out very quickly, and usually is of very short duration, while differentiation is also made by the absence of constitutional symptoms or the peculiar symptoms of the drug.

The malignant types of scarlet fever have sometimes characterized entire epidemics, but they are now rarely seen. Such cases are seen from the start to be very serious, being attended with high fever, rapid and feeble pulse, intense and persistent vomiting, headache, delirium, and coma, death ensuing in two or three days.

Treatment.—As scarlet fever is self-limiting, and no specific remedy is known that in any way reduces the virulence of the intoxication, reliance must be placed on careful nursing of the patient, constant watch to ward off complications, measures for the relief of such complicating inflammations as do develop, and scrupulous efforts to prevent the spread of the disease. Since isolation must be continued for six weeks at least, it is important to select a bright, sunny room, if possible, having an open fire. The patient is kept in bed for at least two weeks, commonly much longer. The vomiting is relieved by small pieces of cracked ice; the throat is sprayed twice daily with a mild antiseptic, such as boric acid; the patient is bathed with lukewarm water if the temperature is high, but antipyretic drugs are best avoided. After desquamation begins the entire body is covered daily with a simple ointment to favor it and to diminish the possibility of the contagion being carried. For the first four weeks of the disease the diet consists entirely of milk, but careful watch must be kept of the kidneys, as their impairment may demand a longer continuance of that diet. Not until the lapse of six weeks at least is the patient allowed to go out of doors, and not then if the weather be inclement. To prevent the spread of the disease, thorough disinfection of the sick-room and all of its contents is essential. The patient is thoroughly washed with a solution of corrosive sublimate, then removed to another room to be dried and dressed. The mattress is wrapped in wet cloths, removed from the house, and preferably destroyed. Everything that has been left in the sick-room should be disinfected with solutions

of antiseptic property, or subjected to the action of steam in a closed chamber. The wall paper should be scraped off, and the walls, ceiling and floor washed with a strong solution of corrosive sublimate, a mop or a loaf of bread being used. Formaldehyde gas is then to be generated in the room for ten hours, after which the windows are left wide open for several days.

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Scarlet Ibis. See IBIS.

Scarlet Letter, The, a novel by Nathaniel Hawthorne published in 1850. The scene is in Boston about the middle of the 17th century. The chief characters are Hester Prynne; her lover, Arthur Dimmesdale, the young but revered minister of the town; their child, Pearl; and her husband Roger Chillingworth, an aged scholar, who had sent his young wife Hester to the New World before him. At the beginning of the tale Chillingworth arrives in Boston, to find her upon the pillory, her babe in her arms and upon her breast the Scarlet Letter "A" ("Adulteress"), which she has been condemned to wear for life.

Scarlet Tanager. See TANAGER.

Scarlett, Sir James Yorke, English soldier: b. 1799; d. December 1871. He was educated at Eton and Cambridge, entered the army, and in 1854 was sent to the Crimea in command of the heavy brigade. On the 25th of October he led the brigade in its famous charge at Balaklava, and later in the day it brought out of action the remnants of the light brigade after its even more famous charge. In both of these actions Scarlett took a prominent part in the hand to hand conflict. For these services he was promoted to the rank of major-general, on 12 December following, and upon the retirement of Lord Lucan took command of the entire cavalry forces in Crimea. In July 1855 he was created a K.C.B. He commanded the camp at Aldershot 1865-70, and retired from active service in the last named year.

Scarpa, skär'pā, Antonio, Italian anatomist: b. Friuli, Italy, 13 June 1747; d. Pavia, Italy, 31 Oct. 1832. He studied medicine at Padua, in 1772 was appointed professor of anatomy at Modena, and published in that year his first work on the anatomy of the ear, 'Anatomicæ Observationes de Structura Fenestræ rotundæ Auris.' In 1783 he resigned this chair to accept a similar one at Pavia, where he published his great work, 'Anatomicæ Disquisitiones de Auditu, etc.' (1789). At the time of the revolution in Italy he was deprived of his professorship in the university on account of refusal to take the oath required by the Cisalpine Republic. He now published his celebrated work on 'Aneurisms' (1804). When Napoleon, after his coronation as King of Italy, arrived at Pavia (1805), and received the officers of the university, he inquired after Scarpa. He was informed that he had long ceased to be a member of the university, and was told the reason. "What," said Napoleon, "have political opinions to do here? Scarpa is an honor to Pavia and to any dominions. Let him be honorably restored." Scarpa was the author of several other surgical works besides those already mentioned. Most of his works have been translated into English and French.

Scarpanto, skär'pān-tō (ancient CARPATHOS), a Turkish island of the Mediterranean, 28 miles southwest of Rhodes. It is 27 miles long by six miles wide, is rocky and mountainous, and has four harbors, two on the east, one on the north, and one on the southwest side, known respectively as Port Pernes, Port Avdemo, Port Skomaco and Port Grato. There are indications pointing to a former dense population, as judged from the numerous ruins of towns. Pop. 5,000.

Scarron, skā-rōn, Paul, French author and playwright: b. Paris, France, 6 July 1610; d. there 6 Oct. 1660. Refusing to take orders he led a wild life in Paris and in Rome, to which city he went in 1634. Shortly after his return to Paris in 1637 he was stricken with an illness which left him a paralytic for the rest of his life. His mind was not affected, however, and he made his livelihood by literature. At one time he was the pensioner of the queen, but losing his pension through the influence of the Cardinal Mazarin, he then wrote in revenge his satirical 'Mazarinade' (1649), one of his best-known works. He married in 1652 the young and beautiful Francine d'Aubigne, afterward Mme. de Maintenon. Both before and after this event, which Scarron survived eight years, his house was the centre of a brilliant literary society. The most famous of Scarron's writings in his own time is said to have been his 'Virgile Travesti' (1648-53), but modern critics prefer his 'Roman Comique' (1651). There have been many editions of his works, the best are those published in Amsterdam, 10 vols. (1737) and reprinted at Paris, 7 vols. (1786).

Scarzonera, a genus of composite plants with numerous species, chiefly indigenous to the Mediterranean regions. The flowers are yellow or rarely rose-colored, having many series of involucre bracts, plumose and unequal pappus, and achenes without a beak and generally wingless. *S. hispanica*, sometimes known as viper's grass, has long been cultivated for its tapering, fleshy, edible roots, the dark-brown skins of which have caused it to be called black salsify. The leaves are long and lanceolate with waving edges. Other species are also cultivated for their roots.

Scaup, skāp, or Blackhead Duck, a duck (*Aythya marila*), of the same genus as the red-head (q.v.), which it closely resembles in form but from which the green-glossed black head of the male, and the white face of the female, distinguish it. It is a very abundant duck about the shores of the North Atlantic, frequenting the sounds, bays and estuaries of the United States to Central America, in winter and in the spring passing northward and inland to breed. On the coasts of the New England and Middle States the scaup is most abundant during the fall migration, occurring in flocks which feed chiefly upon small mussels, and other marine animals, especially mollusks, secured by diving.

A closely related species is the lesser scaup duck (*A. affinis*), which is almost an exact smaller counterpart of the black-head, except that the head of the male is glossed with purple instead of green and the length is about 16 instead of 18 inches. This species regularly consort with the larger scaup and is altogether sim-

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ilar in distribution and habits. Both species are shot in large numbers by sportsmen and market gunners and regularly sold in the markets, but the flesh is rather coarse and strong-flavored.

Scel'idothe'rium. See MEGATHERIUM.

Sceloporus, sē-lōp'ō-rūs, a genus of lizards of the family *Iguanidae*, to which the Florida chameleon (*Anolis*) and the horned toads (*Phrynosoma*), also belong. Among its kindred, this genus is distinguished by its imbricated keeled scales, the absence of a dorsal crest, of gular folds or a gular sac, and of head-spines. The tympanum or ear-drum is exposed between the small scales of the side of the head; the tongue is fleshy and shaped somewhat like an arrow-head; teeth are confined to the jaws and have trilobate summits. Femoral pores, the secretion of which assists the sexes in mating, are well developed. Between 30 and 40 species of this genus are known, all of them American and most of them confined to Central America, Mexico and the southwestern United States. In this region these lizards are exceedingly abundant and are everywhere conspicuous objects. They are chiefly terrestrial, but many of the species also live upon stone walls or fences or run up tree trunks when alarmed. Their food consists of insects, which they seize with the greatest agility. In temperate regions they hibernate in cold weather. The males are generally ornamented with bright colors on the under parts which may be considered to be secondary sexual characters. The eggs, which have a parchment-like shell hardened with lime, are usually retained in the oviducts until the young are partly or wholly developed; when deposited, holes in the ground, decayed stumps, etc., are utilized for their concealment. As in many other lizards, the tail is easily broken along an unossified plate across the body of the vertebrae, after which it regenerates but always imperfectly. The only eastern species is the common swift or fence-lizard (*S. undulatus*). Consult Cope, 'The Crocodilians, Lizards and Snakes of North America,' U. S. Nat. Mus. (Washington 1900).

Scenic and Historic Preservation Society, American. See AMERICAN SCENIC AND HISTORIC PRESERVATION SOCIETY.

Scepticism, in its widest meaning, is a state of doubt or suspense of judgment. It is often used in connection with religious belief, and here indicates doubt or disbelief of authorized doctrines. The word scepticism has a specific meaning, however, which is implied in its more general uses, and in this meaning it has a philosophical reference and relates to the problem of knowledge. Thus used, scepticism signifies systematic doubt or entire disbelief in the ability of the human mind to attain knowledge of positive or objective truth. Such scepticism has been of frequent occurrence in the history of thought from antiquity to the present time. It has received systematic expression from several noted thinkers who supported their conclusions by explicit arguments. The grounds of systematic scepticism are many and cannot be given in full detail. Its fundamental basis in theory is usually found in the assumption that knowledge arises from a succession of particular sensations which are (1) subjective modifications, and (2) detached and transitory mental

states. As subjective modifications, these sensations are the product of the sense-organs of the individual. Their nature depends upon the structure of the particular sense-organ, which varies with each individual, and also upon the bodily condition of the individual which varies from moment to moment. Hence these sensations, being relative to individual structures and conditions, have only a subjective value, and can yield no truth that is objective and necessary for all. As detached and transitory mental states, these sensations can furnish no criterion of truth beyond the single sensation. Because detached and particular, such a single sensation can justify no conclusion of universal validity. Because itself transitory, such a single sensation can reveal nothing of a permanent and abiding reality. Beside these theoretical considerations, many practical reasons have been urged to support scepticism, such as the difference of opinion and belief among different peoples upon most vital matters of life and morals. In antiquity the first important exponents of scepticism were the Sophists of Greece. Of this school Protagoras held that all truth was relative, since all sensations were subjective. At a later period in Greek thought, a systematic scepticism was developed by Pyrrho of Elis and elaborated by his school. According to the Pyrrhonic scepticism, the real nature of things is entirely unknown to us because of the subjectivity of our impressions and opinions; and, consequently, our proper attitude is one of suspense in judgment, and apathy in conduct. The foremost representative of scepticism in modern times is David Hume. He maintained that "all knowledge resolves itself into probability"; for, being based upon particular impressions, it can reveal nothing of permanent or objective reality beyond the succession of sensations. In estimating the importance of scepticism in the history of thought, one must distinguish between scepticism as (1) a provisional stage, and (2) a final conclusion of thought. As a provisional stage, scepticism has discharged an important office in the development of thought. In the life of both individual and race, periods of scepticism are useful in disposing of traditional beliefs which lack adequate foundation, and so in preparing the way for better-established conclusions. Thus with Descartes a stage of doubt was preliminary to his positive thought, and likewise the scepticism of Hume was preliminary to the constructive philosophy of Kant and his successors. As a final conclusion scepticism has never been permanently satisfactory, because the inherent demand of the human mind is for positive truth.

Consult: Plato, 'Protagoras'; Zeller, 'Stoics, Epicureans, and Sceptics'; Hume, 'Treatise of Human Nature'; Owen, 'Evenings with Sceptics.'

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Sceptre, originally a staff, the emblem of sovereign power. The *baton*, or short sceptre, has always remained a sign of distinction. In the Greek assemblies a person who wished to speak received a sceptre from the herald; and the judges also bore it while in the exercise of their authority. Kings swore by the sceptre. By degrees it became the emblem of power alone. Through the Roman emperors it passed to the western monarchs.

Schadow, shā'dō, Johann Gottfried, German sculptor: b. Berlin 20 May 1764; d. there 27 Jan. 1850. After many vain struggles to become an artist, he was admitted to the studio of the sculptor Tassaert and thus at length succeeded in devoting himself to his chosen art. Soon afterward he ran off with his sweetheart to Vienna, and there married her; and then, at the expense of his father-in-law, went to Italy, where he wrought with unwearied diligence from 1785 to 1787 in the museum of the Vatican and of the Capitol, winning a prize by his group 'Perseus and Andromeda.' In 1788 he obtained the position in Berlin which had become vacant by the death of his teacher Tassaert. His first great work was the monument erected in the church of Saint Dorothea, Berlin, to the memory of the margrave, natural son of Friedrich Wilhelm II. This was followed by the colossal statue of Ziethen in hussar uniform; the statue of Frederick the Great in Stettin; of Leopold of Dessau in Berlin; of Blücher in Rostock; the Tauenzien monument in Breslau; Luther's in Wittenberg, etc. The four-horse chariot of Victory, over the new Brandenburg Gate of Berlin, was modeled by Schadow. Schadow executed many busts of his eminent countrymen, and numerous reliefs and statuettes. In 1788 he was made rector, and in 1822 director, of the Academy of Art in Berlin, a position which he retained till his death. He was one of the first of the modern sculptors who dared to withstand the fantastic mannerism of the 18th century for which he substituted a powerful representation of character based on a study of the antique. His most eminent pupil in this respect is Rauch; among his other pupils may be named Dannecker, Tieck, and Zauner. His chief literary works are: 'Wittenberg Denkmäler der Bilderei, Baukunst, und Malerei, mit historischen und artistischen Erläuterungen' (1825); 'Polyklet, oder von den Massen des Menschen nach dem Geschlechte und Alter' (1834); 'National-physiognomien, oder Beobachtungen über den Unterschied der Gesichtszüge und die äussere Gestaltung des menschlichen Kopfs, in Umrissen bildlich dargestellt' (1835); 'Kunstwerke und Kunstansichten' (1849). Consult Dobbert, 'Gottfried Schadow' (1887).

Schadow, Rudolph, son of the preceding, German sculptor: b. Rome 9 July 1786; d. there 31 Jan. 1822. He was trained as sculptor by his father and his principal works are 'Spinning Girl'; 'Achilles and Penthesilea'; 'John Baptist'; and 'Virgin and Child.'

Schadow-Godenhaus, shā'dō gō'den-hows, Friedrich Wilhelm, younger brother of the preceding, German painter: b. Berlin 6 Sept. 1789; d. Düsseldorf 19 March 1862. He received his first lessons in drawing from his father, then turned to painting, and became the pupil of Weitsch. He served in the war between 1806 and 1807 and three years later resumed his artistic studies in Rome, where Cornelius, Overbeck, Veit and others had founded the new school of the Nazarenes (q.v.). He joined their company and from that time made the Italian masters his models, while the favorite subjects of his pencil were biblical, or selected from the mystical and allegorical wonders of mediæval tradition. As in the case of Overbeck, his devo-

tion to this latter field of human imagination led him to become a member of the Roman Catholic Church. He painted 'Heaven's Queen' for Madame von Humboldt, and a 'Holy Family' for the Crown Prince Ludwig of Bavaria. The best work he did at Rome is seen in the frescoes for the Casa Bartholdy; 'Jacob with Joseph's Bloody Coat'; 'Joseph in Prison' (both in the Berlin National Gallery). In 1819 he was called to Berlin as professor of the Art Academy there. During his incumbency he painted the 'Bacchanalian Procession' on the proscenium of New Theatre; many portraits; the 'Visit of the Wise Men' in the Garrison Church at Potsdam and another altar-piece for the church at Schulpforta. One of his finest pictures is 'Freeborn Poetry,' a lovely winged maiden rising from earth to heaven. In 1826 he was made director of the Academy in Düsseldorf and with a circle of enthusiastic pupils became the founder of the Düsseldorf school. Among his religious paintings are 'Christ on the Mount of Olives'; 'Christ at Emmaus'; 'The Dead Body of Christ watched over by his Mother surrounded by Angels' (1836). His health drove him to seek a change in the warmer climate of Italy (1840), and at Rome he painted 'Earthly and Heavenly Love'; 'Piety and Vanity in their Relationship with Religion,' the last appearing under the form of the Saviour, and 'Heaven, Purgatory, Hell' after Dante. As an author he wrote 'The Influence of Christianity on the Painter's Art' (1843). He was perhaps more successful as a teacher and demonstrator than as a creative artist, but he had a very distinct, even though one-sided influence, upon the religious art of Germany. He gave a new and vigorous impulse to the oil painting of his day without resorting to that pre-Raphaelite realism which sometimes lent to the canvases of Cornelius a certain crudeness bordering on the grotesque. Consult Hübner, 'Schadow-Godenhaus und seine Schule' (1869).

Schaeberle, shā'berl, John Martin, American astronomer: b. Württemberg, Germany, 10 Jan. 1853. He was brought to Ann Arbor, Mich., in his infancy, and was graduated from the University of Michigan in 1876 as a civil engineer. He has, however, devoted himself to the study of astronomy, to which department of knowledge he has made valuable contributions. From 1876 to 1888 he taught astronomy in the University of Michigan, and was then called to the Lick Observatory at Mount Hamilton, Cal., where he made several important astronomical investigations. He had charge of the expedition to witness the eclipse at Cayenne in 1889, and of those for the same purpose to Chile in 1893, and to Japan in 1896. Since the latter date he has been chiefly engaged in the construction of telescopes. He has discovered three comets.

Schaff, shāf, Philip, American clergyman and scholar: b. Coire, Switzerland, 1 Jan. 1819; d. New York 20 Oct. 1893. He studied at Tübingen, Halle, and Berlin, and was a lecturer in the latter university in 1842-4. He then came to this country where he was professor in the theological seminary of the German Reformed Church at Mercersburg (Pa.) 1844-63. In 1864-9 he was lecturer in several theological institutions, and in 1870 became professor of sacred literature in Union Theological Seminary,

New York. This post he held till his transference in 1887 to the chair of church history in the same institution. He was one of the founders of the Evangelical Alliance and went as delegate to its general conferences at Basel in 1879 and at Copenhagen in 1884. He was president of the American Bible-revision committee, organized by him in 1871 at the request of the British committee. He was a prolific writer, his works including 'History of the Apostolic Church' (1853); 'History of the Christian Church' (1867; new and enlarged edition, seven vols. 1889-92); 'Creeds of Christendom' (1877); 'Schaff-Herzog Encyclopædia of Religious Knowledge' (as editor); 'Dictionary of the Bible' (1880); 'Church and State in the United States' (1888); 'Literature and Poetry' (1890).

Schaffhausen, shāf'how-zën, Switzerland:

(1) capital of the canton of its own name, situated on an eminence overlooking the Rhine, 24 miles north of Zürich. It is quaintly and irregularly built. The buildings most worthy of notice are the feudal castle of Munot, of Roman construction, standing on a commanding height; the parish or Saint John's Church; and the Cathedral (1052), a massive basilica containing a bell whose inscription suggested Schiller's 'Song of the Bell,' and Longfellow's 'Golden Legend'; the town-house (1412); the Imthurneum, containing theatre, concert rooms, etc., the museum containing MSS. collections of Johann von Müller, who was born here, the town library, etc. There are primary and high schools. The environs are beautiful; three miles distant are the celebrated falls of the Rhine, almost 300 feet broad, falling more than 70 feet in three cascades formed by two pillars of rock. The Fäsenstaub is a fashionable promenade. The principal industrial works are the wagon and carriage factories, cotton and woolen manufacturing, iron works, distilleries and breweries. Pop. (1900) 15,275. (2) The canton of Schaffhausen covers an area of 113½ square miles, and occupies the most northern angle of the Swiss territory. It belongs to the Swabian Jura, and the population uses almost exclusively the German tongue. The canton entered the Swiss Confederation in 1501, and by the Constitution of 1876 became exceedingly democratic. Education is compulsory. The taxes are very low. Financially it is the most favored among the Swiss cantons. All the cereals are raised, besides hemp and flax. There is abundance of fruit, especially grapes. The principal manufactures are: aluminum, wagons, wool, ropes, and watches.

Schäffle, shā'flē, Albert Eberhard Friedrich, German political economist and sociologist: b. Nürtingen, Württemberg, 24 Feb. 1831; d. Stuttgart 24 Dec. 1903. He was educated for the ministry at Tübingen but adopted a journalistic career. In 1861 he was called to the University of Tübingen as professor of political economy, and in 1868 to Vienna. His principal contributions to the literature of political science are his 'National Economy' (1873); 'Capital and Socialism' (1870), and 'The Fundamental Principles of Taxation' (1880). In 1895 he began to write upon sociological questions and to develop the biological theory of society. His 'Bau und Leben des sozialen Körpers' is a

more detailed attempt to explain society as a living organism than that essayed by any previous writer. This book, completed in 1890, placed him in the ranks of modern sociologists.

Schalcken, shāl'kën, Godfried, Dutch artist: b. Dordrecht 1643; d. The Hague 16 Nov. 1706. He was the pupil of Samuel van Hoogstraten, and Gerard Dow. He visited England where he executed portraits, especially one of William III. His best work is in genre, and here he approached though still remained inferior to his master Dow. He was fond of representing scenes by candle light, though he was scarcely ever quite true in the color representation of such light. When he attempted portraits in full length, as the fashion of the time of Sir Godfrey Kneller demanded, his efforts were not successful, with the possible exception of the portrait of William III., now in the Amsterdam Museum. Some of his best works are at the museums of Vienna, Dresden, Munich, Berlin, Amsterdam, The Hague, and at the Louvre.

Schamyl, shā'mīl (SAMUEL), Tartar imam and warrior, leader among the tribes of the Caucasus: b. Aul Himri, northern Daghestan, 1797; d. Medina March 1871. From 1824 to 1831 he took energetic part in Kasi Mollah's 'holy war' against the infidel Russians, being severely wounded at the storming of Himri. A Sufi, he labored for the recrudescence of his faith in Daghestan, and was markedly successful. From 1837 he was temporal and spiritual head of the mountain tribes. His guerrilla method of warfare long enabled the Circassians to continue the struggle against Russia. During the Crimean war he was supplied by the allies with arms and money. After incredible escapes he was at last taken (6 Sept. 1859), and kept under surveillance, though treated with consideration.

Scharf, shārf, Sir George, English artist: b. London 16 Dec. 1820; d. Westminster 19 April 1895. He studied art under his father, a Bavarian artist who had settled in England, and in 1838, after gaining medals from the Society of Arts, entered the Royal Academy schools. In 1840 he visited Asia Minor and again in 1843 as draughtsman to a government expedition. On his return he devoted himself to painting in oil and to book-illustration, among the books illustrated by him being Murray's 'Prayer Book,' Macaulay's 'Lays,' Milman's 'Horace,' Kugler's 'Handbook of Italian Painting,' Layard's books on Nineveh, Keats' Poems, and Sir W. Smith's Classical Dictionaries. He rendered valuable assistance to the Crystal Palace authorities in planning the Greek, Roman, and Pompeian courts, and to Charles Kean in his Shakespeare revivals of 1851-7. He was art secretary to the Manchester exhibition of 1857, and on the foundation of the National Portrait Gallery he began to make a special study of portraits, on which he soon became a recognized authority, and in 1882 he received the title of director of the gallery. His publications comprise: 'Recollections of Scenic Effects' (1839), the part on sculpture in Waring's 'Art Treasures of the United Kingdom' (1857). To his great knowledge and industry the National Portrait Gallery owes almost its whole value.

Scharf, John Thomas, American historian: b. Baltimore, Md., 1 May 1843; d. there 28 Feb. 1898. At the outbreak of the Civil War he entered the Confederate army, was engaged in the battles around Richmond, at Cedar Mountain, the second battle of Bull Run and at Chancellorsville, and in 1863 became a midshipman in the Confederate navy. He participated in the capture of the Underwriter, near New Berne, N. C., and after the blockade was established he again joined the army. While on his way to Canada with despatches he was captured. In 1874 he was admitted to the bar, was a member of the legislature in 1878 and in 1884 he was appointed commissioner of the land office of Maryland. He was editor of the Baltimore 'Telegram' and of the 'Morning Herald,' and wrote: 'Chronicles of Baltimore' (1874); 'History of Maryland' (3 vols. 1879); 'History of the Confederate States Navy' (1887); 'Natural and Industrial Resources and Advantages of Maryland' (1885-90); etc.

Scharnhorst, shārn'hōrst, Gerhard Johann David von, Prussian general: b. Bordenau, Germany, 12 Nov. 1755; d. Prague 28 June 1813. He entered the Hanoverian army in 1780 and soon distinguished himself as an officer of artillery. In 1804 he was knighted by the king of Prussia, and in 1813 attained the rank of general in the Prussian army. In the reorganization of the army of Prussia in 1809-13 he proved himself an able general. The national spirit, awakened by the loss of the territories west of the Elbe, was greatly augmented by the genius of Scharnhorst, who infused the military spirit throughout the scattered populations of the Prussian domain by raising a large and well disciplined volunteer army for the war of Liberation. In this campaign he was chief of staff under Blücher, but was mortally wounded at the battle of Lützen. Consult 'Life' by Lehmann (1886-7); von Boyen, 'Erinnerungen' (1891).

Schechem, shēk'ēm, Palestine. See **NABULUS**.

Schechter, shēh'tēr, Solomon, American theologian and Orientalist: b. Fokshan, Rumania, 1847. Participating in the rabbinical training given to Jewish children of his environment, in maturer years he attended the Berlin and the Vienna universities, and was graduated as rabbi in Venice. He was reader of Semitics, Cambridge University, England 1892-1902, and professor of Hebrew at University College, London 1898-1902. He traveled in Italy, Egypt, and Palestine, and made interesting discoveries of MSS. of peculiar value to students of the Old Testament. He has written: 'Aboth de Rabbi Nathan' (1887); 'Studies in Judaism' (1896); 'The Wisdom of Ben Sira' (1899), and since 1902 has been president of the Jewish Theological Seminary of New York.

Schedone, shā-dō'nā, or Schidone, Bartolommeo, Italian painter: b. Modena about 1570; d. there 1615. He acquired an admirable style by a careful and long continued study of Correggio, and his natural genius under the inspiration of that master enabled him to produce a great number of graceful and delicate pictures, both in fresco and oils. His portraits are the most remarkable of his productions and he

Painted many of the principal citizens of his native town. He also executed a great many religious paintings, and was a successful etcher.

Scheele, shā'lē, Karl Wilhelm, Swedish chemist: b. Stralsund 9 Dec. 1742; d. Köping 21 May 1786. His early education was received at Gothenburg. In 1770 he was made assistant professor of chemistry at Upsala, and there became celebrated as one of the greatest scientists of his time. His independent discovery of oxygen, a few months after that of Priestley, places him in the front ranks of the early physicists. He is known also as the discoverer of tartaric acid, chlorine, baryta, glycerine, and prussic acid. A new coloring matter commonly known as Scheele's green, was obtained by his experiments with arsenic. He was the author of: 'Chemical Observations and Experiments on Air and Fire' (1777); 'Essay on the Coloring Matter in Prussian Blue' (1782).

Scheelite, native calcium tungstate. A mineral often found in crystalline quartz, associated with cassiterite, topaz, fluorite and wolframite. It is distinguished by its high specific gravity, 5.88 to 6.14, moderate hardness, 4.5 to 5, vitreous to adamantine lustre, the pyramidal hemihedrism of its tetragonal crystals, and their eminent pyramidal cleavage. Its streak is white, but its superficial colors vary greatly, white, yellowish or brownish being the most common. It is a widely distributed, though not an abundant mineral, its occurrences in Bohemia, Saxony, Piedmont, and England are the best known, while in Tasmania and at Trumbull, Conn., it is found in commercial quantities and has been mined as an ore of tungsten. Molybdenum is usually present replacing part of the tungsten.

Schefer, shāf'ēr, Leopold, German author: b. Muskau, Lower Lusatia, 30 July 1784; d. there 16 Feb. 1862. After a gymnasial training, he devoted himself to literature, the only post he held being that of superintendent of the estates of Count Pückler, with whom he made in 1816-20 a journey to Italy and the East. His study of Oriental philosophy and religion appears in much of his verse. His works of fiction, structureless and vague in characterization, are greatly inferior to his poetry, which is collected in such volumes as: 'Vigilien' (1842); 'Gedichte' (3d ed. 1846); 'Das Laienbrevier' (1834; 18th ed. 1884); and 'Der Weltpriester' (1846). The last two were turned into English by C. T. Brooks (q.v.), as 'The Layman's Breviary' (1868), and 'The World Priest' (1873). Schefer was also something of a composer, writing an opera ('Sakontala') and several quartettes. His 'Ausgewählte Werke' appeared in 1845-6 (2d ed. 1857). Consult the biography by Brenning (1884).

Scheffel, shēf'fēl, Joseph Victor von, German poet: b. Carlsruhe 16 Feb. 1826; d. Carlsruhe 9 April 1886. He was educated for the law at Heidelberg, Munich, and Berlin, but gave up his legal career almost as soon as it was begun for that of literature. His first and greatest book, 'Der Trompeter von Säckingen,' appeared in 1854. This poetic romance of the Thirty Years' war reached its 190th edition in 1891. His second book, a romance in prose entitled 'Ekkehard,' was also one of the most

popular of German love stories. His other works are: 'Hugideo' (1884), and 'Guadeamus' (1867-91); both romances; 'Frau Aventure' (1863-83); 'Bergpsalmen' (1870-83); 'Waldeinsamkeit' (1880). Consult: Lives of Proëss (1887); Ruhemann (1866); Pilz (1887), and Zernin, 'Erinnerungen' (1886).

Scheffer, shĕf'fēr, Ary, Dutch painter: b. Dort, Holland, 1795; d. Argenteuil, near Paris, 15 June 1858. At an early age he sought Paris to study for the profession of an artist. Here he became a pupil of P. Guérin. His first picture, 'Abel singing a Hymn of Praise,' was exhibited in 1812, and at once established his reputation. In 1817 he produced the 'Death of Saint Louis'; in 1819 the 'Surrender of Calais to Edward III.'; and in 1822 'Francesca da Rimini.' Of extremely versatile talents, Scheffer traversed a very wide field in the domain of art, and his pictures comprise subjects both sacred and secular, historical and imaginative. Of the first of these the most celebrated are 'Christ Blessing Little Children'; 'The Agony in the Garden'; and 'Christ the Comforter.' From the writings of Goethe he has produced some admirable works, such as 'Margaret,' 'Mignon,' the 'King of Thule,' and others; from Dante, 'Beatrice,' from Byron, 'Medora'; and from Schiller, 'Eberhardt.' Scheffer's pictures are principally remarkable for the refinement of expression and depth of feeling which they display. They are highly prized by collectors and a small replica of 'Paolo and Francesca da Rimini' was sold in 1870 for \$9,607. Many of his chief works are in the Luxembourg or at Versailles.

Scheiner, Shĭ'nēr, Christolph, German Astronomer: b. at Walddt in Swabia about 1575; d. 1650. Scheiner was professor of Hebrew and mathematics at Freiburg, and at Ingolstadt from 1610-16, and after several years residence in Rome he became rector of the Jesuit College of Neisse in Silesia. In 1612 he published his 'Tres Epistolæ ad Marcum Velserrum' and claimed to have seen sun spots as early as March 1611. He thus antagonized Galileo whom he further provoked by upholding the old thesis of a 'stable' earth and a 'mobile' sun. 'Rosa Ursina' (1630) was his great work on the sun and contained the results of about two thousand observations.

Scheldt, skĕlt, or **Schelde**, shĕl'dĕ (ancient, SCALDIS), a river belonging in the various parts of its course, to France, Belgium and the Netherlands. It rises in the French department of Aisne, at a height of 295 feet above sea-level, Mount Martin, in the small lake of Beauvoir, near Catelet. It follows a circuitous route as far as Condé, where it first becomes navigable after junction with the Saint Quentin Canal. It enters Belgium between Montagne and Hollain and at Ghent is joined by the Lys and the canals which connect this town with Sas and Bruges. There is considerable tide at Ghent, somewhat modified by sluices. The river then makes a great bend toward Dendermonde and Antwerp, flows circuitously north forming the boundary between Antwerp and East Flanders Provinces. At Antwerp it measures 1,600 feet in width, 45 feet in depth, and still wider below, forms a secure harbor, which is capable of receiving the largest ships. Again turning northward, it is finally lost in the estuaries among the

islands of Zealand. After reaching the Dutch frontier it divides into the East and West Scheldt, the latter and main stream, flowing into the North Sea, below Flushing. Both branches connect with the Meuse and the Rhine. The entire length of the river is 211 miles. Its principal affluents are the Haine Dender, the Rupel, the Sensée, Scarpe and Lys.

Schelling, shĕl'ling, Felix Emmanuel, American educator and author: b. 3 Sept. 1858. He was graduated from the University of Pennsylvania in 1881, is professor of English literature there, and has written: 'Literary and Verse Criticism of the Reign of Elizabeth' (1891); 'The English Chronicle Play' (1902); etc. He has also edited editions of various standard works.

Schelling, Friedrich Wilhelm Joseph von, German philosopher: b. Leonberg, in the kingdom of Württemberg, 27 Jan. 1775; d. Ragaz, Switzerland, 20 Aug. 1854. He studied at Tübingen, and for a short time also at Leipsic, and from thence proceeded to Jena, then the centre point for philosophical studies, under the guidance of Reinhold and Fichte. His own tendencies in this direction were, from the first, mainly guided by the latter, and in 1798 he lectured first as a colleague, and afterward as successor of Fichte. In 1803 he was appointed professor of philosophy at Würzburg, and in 1806 member of the Academy of Sciences at Munich, of which he subsequently became secretary. He lectured at Erlangen from 1820-6, and in 1827 became a professor at Munich, whence he was called to Berlin in 1841 as a member of the Academy of Sciences, and lectured for several years in the university of that city on mythology and revelation. He retired some years before his death.

Schelling's philosophy, or system of identity, lays down two distinct views of philosophical reasoning, one belonging to the intellect alone, whose province is ideas and judgments, and the other to the reason or the connecting faculty. The intellect or faculty of ideas distinguishes, separates, and places asunder what originally is united and in itself one. Merely comprehended by the intellect, the universe divides itself into two great regions, negative and positive, which, under their various phases, are denominated respectively Matter and Spirit, Objective and Subjective, Real and Ideal, Being and Thought, and Body and Soul. As regards mere reflective philosophy, the two regions are separated from each other by a wide gulf, and each is governed by its own peculiar laws. And in the same manner as with these two regions is there a separation of the Finite and the Infinite. The Infinite is shown as the Beyond or the Finite which we cannot comprehend by our understanding, but only by faith or presentiment. But as our Reason is only one, and strives to attain the highest unity, it cannot divest itself of the thought that there can only be one Supreme Existence, one Absolute, which, embracing everything, contains within itself the uniting power of the two regions separated in our intellect. The antithesis of the two regions is only relative; both are originally and essentially One, and only two different forms of manifestation of the One Infinite. The Infinite or Absolute is the eternal, absolute identity of Nature and Spirit, of the Objective and the Subjective, of the Real and the Ideal, so that

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these two, called also by Schelling the poles of the Absolute, are not two distinct essences, but only two distinct forms or manifestations of the same Absolute Principle. Nature is the entire Absolute of the Real, but under the form of expansion or intuition. Spirit is the Absolute of the Ideal, but under the form of Thought. Nature is accordingly the objective, unconscious working eternal spirit itself, and Spirit is Nature aroused to a consciousness of herself. The laws of Nature are therefore at the same time the laws of Spirit, and conversely. In accordance with this position the differences and antitheses among things are not essential, but only apparent and relative, for in themselves they are different forms and modifications of the same Absolute. That circumstance by which one thing, determined as such, separates itself infinitely from others, is its untrue side. Just in the same manner does it go astray and expiate, as it were in death, its misdemeanor, for having fallen away from the Absolute, and endeavored to form an independent existence for itself. The law of the universe is therefore a double one: the eternal production and development of Absolute Identity into the things of time, and the eternal strivings of the Finite to return and reunite itself with the Absolute. Yet this opinion is not to be admitted in the whole strength of the idea. For as the Finite is not in reality opposed to the Infinite, but only a particular form of it, so also it has not really fallen away from the Infinite, but only appears so to us, considered from the standpoint of reflection. In itself the Infinite is as the One, also as the All, and All in All, the only true and real existence. And upon this rests the possibility of knowledge. For as man is himself a particular form of the Absolute, so all he can do in order to grasp the Absolute is to examine himself and establish within him the eternal by eliminating the temporal. But the eternal is his reason, in which the Infinite is present with him. Reason itself, as the source of truth, is accordingly in reality not one's human individual reason, but absolute reason, the Absolute itself, as it permeates human consciousness. Moreover, man stands related to the body by natural laws, and unites therewith in himself the two forms of the Absolute, Spirit and Nature, and becomes thus a microcosm, an image of the Highest Existence itself.

The philosophy of Schelling is important not only as the immediate antecedent to that of Hegel, but as in itself one of the most ingenious products of German speculation. Schelling, who survived Hegel, condemned the system of the latter, and gave his own system a new development after Hegel's death. Schelling's system, both in its earlier and later developments, was essentially pantheistic, but its later developments are marked by a strong eclectic tendency, which indicates the dissatisfaction of the speculator with his own results. The principle of identity, which he retained throughout, from the multiplicity of aspects it is capable of assuming, formed a link of connection between the most various systems, and afforded the utmost facilities for an eclectic development. Thus, Plato (from whom he adopted the world-soul) and the Neo-Platonists, Mysticism, Giordano Bruno, the Leibnitzian monads, Scholastic Realism, and Revelation all contributed to his final scheme. He adopted with regard to Revelation the theory

that a Petrine and a Pauline theology are represented in the Catholic and Protestant churches, that these are both dominated by a Johannine theory, in accordance with which he believed his speculation to be framed. His last conceptions of deity, however, appear to approximate most closely to Neo-Platonism. He called his later speculation, based on Mythology and Revelation, positive philosophy, in contradistinction to his speculation on identity, which he called negative philosophy. The object of positive philosophy he defined as being not to prove the existence of God from the idea of God, but from the facts of existence to prove the divinity of the existent. He distinguishes in God a trinity of three persons proceeding from three divine potencies, which issue from a previous unity of indifference, or necessary but unpremeditating being. Man is a person in whom, as a result of liberty, the unity of one of the potencies has been broken.

Schelling's philosophical works have been published in a complete edition, containing a 'History of Philosophy' and other previously unpublished works, edited by his son, K. F. A. Schelling, first division, ten vols.; second division, four vols.; Stuttgart and Augsburg (1856). Consult: Von Hartmann, 'Schelling's Philosophisches System' (1897); Watson, 'Schelling's Transcendental Idealism' (1882).

Schenck, shĕnk, Carl Alwyn, American forester; b. Darmstadt, Germany, 25 March 1868. He studied at Darmstadt and Tübingen, and was graduated from the University of Giessen. He was forest assessor of the grand duchy of Hesse, served in the German army, and came to the United States in 1895. He is director of the Biltmore Forest School and forester to George W. Vanderbilt's Biltmore estate. He has written: 'Our Yellow Poplar' (1896); 'Forestry for Kentucky' (1899); etc.

Schenck, Robert Cumming, American diplomat; b. Franklin, Ohio, 7 Oct. 1809; d. Washington, D. C., 23 March 1890. He was graduated at Miami University in 1827, remained there as tutor until 1830. In that year he became a student of law in the office of the Hon. Thomas Corwin at Lebanon, Ohio, and was admitted to the bar in 1831. He began the practice of law at Dayton, Ohio, and soon achieved marked success in his profession. In 1840, during President Harrison's "Log Cabin" campaign, he was elected to the legislature of Ohio, and entered upon his political career. He soon became a leader in the Whig party, and was recognized throughout his section as an able and effective public speaker. In 1843, after an exciting political contest, he was elected to his first term in Congress, retaining his seat until 1851, and becoming one of the most prominent leaders of his party at Washington. In 1851 he was appointed United States minister to Brazil, where he remained some years, and performed important diplomatic service.

When the Civil War began he promptly tendered his services to the government, and received a commission of brigadier-general of volunteers. He was severely wounded at the second battle of Bull Run, and his right hand and arm permanently disabled. He was later promoted to the rank of major-general, and served in the army until December 1863, when

he resigned his commission to accept a seat in Congress, to which he had been elected in the fall of 1862 over Clement L. Vallandigham (q.v.). General Schenck's military and political abilities were at once recognized and he was appointed chairman of the Military Committee of the House and rendered important and arduous services. He was three times elected to Congress. He served as chairman of the Committee on Ways and Means and became the leader of his party in the House. On 22 Dec. 1870 he was appointed minister to Great Britain by President Grant, a position which he filled with distinction until 1876. During this term of service he was appointed member of the historic Joint High Commission which assembled at Washington, and provided by treaty for the Geneva Conference, a measure that resulted in substituting arbitration instead of war in the settlement of the serious controversies that had arisen between Great Britain and the United States, regarding the Alabama claims, and other important subjects. Associated with him upon the Commission were Hon. Hamilton Fish, Hon. E. R. Hoar and other eminent counsellors, while Great Britain was represented by some of her most distinguished statesmen. The commission was successful in negotiating this important treaty and relieving the strained relations that existed between these two countries thus greatly contributing to the advancement of the great cause of International Arbitration. General Schenck's eminent abilities were brought into full requisition during the conferences of the High Commission. His tact and force, and his knowledge of international law, were most useful in determining the great questions involved.

In reviewing General Schenck's long and useful career as lawyer, legislator, soldier, diplomat and statesman he must be credited with rare and strong intellectual powers. He had courage and decision of character. His ablest qualities appeared to best advantage in the heat of debate. He was always ready with facts and logic, was witty or sarcastic at will, and at times eloquent. In the social life at Washington he had a large circle of devoted friends.

GATES P. THRUSTON,
Tennessee Historical Society.

Schenck, William Edward, American Presbyterian clergyman: b. Princeton, N. J., 29 March 1819. He was graduated from Princeton in 1838, from the Theological Seminary there in 1841, and was ordained in 1843. He was engaged in pastoral work in New Jersey and New York until 1852 and since 1865 has been a director of Princeton Theological Seminary. He has published: 'Church Extension for Cities' (1854); 'Children in Heaven' (1867); etc.

Schenectady, N. Y., city, county-seat of Schenectady County; on the Mohawk River, on the Erie Canal, and on the New York C. & H. R., and the Delaware & H. R.R.'s; 16 miles west of Albany. It has connection with the Boston & Maine Railroad at Scotia, and with the West Shore Railroad at South Schenectady. Local lines connect the city with Troy, Mechanicsville, Saratoga Springs, and other nearby places. That part of the city along the bank of the river is the oldest; most of the modern buildings have been erected on the surrounding heights.

Buildings and Municipal Improvements.—

The principal public buildings are the post-office, county court-house, municipal buildings, Van Curler opera house, a State armory, Home of the Friendless, Children's Home, Ellis Hospital, the Y. M. C. A. building, and the church and school buildings. The location, in the Mohawk Valley, is in a fertile agricultural region. The slope to the river is such as to make the natural surface drainage almost sufficient, but a good sewerage system has been introduced. The water is distributed by means of the Holly system.

Manufacturing.—The census of 1900 gave Schenectady 388 manufacturing establishments, including all the hand and minor trades. These latter are excluded from the census of 1905, which embraces only the 103 principal factories which had an invested capital of \$22,050,746; wage-earners 14,316; yearly wages \$9,382,360; cost of material used \$16,497,228; value of product \$33,084,451. Schenectady is also the headquarters for the General Electric Company and for the American Locomotive Company whose plants in this city alone are employing 23,000 workers or nearly 9,000 more than all the workers employed in the city's 103 principal factories in 1905. Besides the electric and locomotive works, Schenectady has 3 flour mills, 23 bakeries, 4 broom and brush factories, 3 coppersmithing and sheet-iron working factories, 3 foundries and machine shops, 3 lumber and planing mills, 4 mineral and soda water factories, 7 printing establishments, 22 cigar and tobacco factories and 23 principal other factories. In addition the city has other fairly important factories, several of which manufacture for shipment elsewhere.

Churches and Schools.—There are 22 churches, embracing 10 denominations, and representing 26 organizations. The educational institutions are Union College (q.v.), 10 public schools, two parish schools, a business college, three private schools, a free public library, and the college and high-school libraries.

Banking and Finances.—There are two national banks with a combined capital of \$200,000, a savings bank with deposits of about \$5,500,000, and two trust companies with \$500,000 capital and surplus. The annual cost for municipal maintenance and operation is about \$850,000.

History.—Schenectady was settled in 1661 by Arent Van Curler; and letters patent were granted in 1684. On 8 Feb. 1690 the place was attacked by a force of French and Indians, who massacred all but 60 of the inhabitants and burned the town. In 1765 it was incorporated as a borough, and in 1798 chartered as a town. In 1819 a disastrous fire destroyed nearly all the business portion of the city. Among the early steam railroads in the United States was one from Albany to Schenectady. The water communication by means of the Mohawk, increased by the Erie Canal, and the railroad communication at an early date, all contributed toward making the city a commercial and industrial centre. It has increased steadily in population and industries. Pop. (1880) 13,655; (1890) 19,902; (1900) 31,682; (1910) 72,826.

Schenschin, shēn'shīn, Afanassij Afanasje-witch, Russian poet: b. Mzenek district, government Orel, 4 Dec. 1820; d. Moscow 4 Dec. 1892. He studied at Moscow, was in the army in

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1853-6, then devoted himself wholly to literature, and under the pseudonym "A. Fet" published several collections of lyrical verse (1840; 1850; 1863; 1883-91). He also made excellent renderings from Shakespeare, Goethe, and the Latin classics.

Schérer, shā-rār, Edmond (Henri Adolphe), French critic: b. Paris 8 April 1815; d. Versailles 16 March 1889. He studied at the law faculty of Paris, took a course in theology at Strasburg, entered the Protestant ministry in 1840, and in 1845 became professor of exegesis in the Ecole Evangelique, Geneva, popularly known as L'Oratoire. This he resigned in 1849, and became a leader in the liberal movement in Protestant theology. He was elected to the National Assembly from Seine-et-Oise in 1871, and became life-senator in 1875. In both chambers he was a prominent representative of the left centre. He was made chief literary critic of the 'Temps' in 1860, later its editor. He took rank as a brilliant though opinionated critic, his reputation in this field having been made by a series of articles on important thinkers and writers of other literatures in the 'Revue des Deux Mondes.' Among his writings in book form are 'Dogmatique de l'Eglise Réformée' (1843); 'La Critique et la Foi' (1850); 'Alexandre Vinet, sa vie et ses écrits' (1853); 'Etudes Critiques sur la Littérature Contemporaine' (1863-89); 'Diderot' (1880); and the posthumous 'Etudes sur la Littérature au XVIIIe Siècle' (1891). He also wrote a biography of Melchior Grimm (1887). Consult: the study by Gérard (1890); article by Dowden in the 'Fortnightly,' Vol. XLV. (1889); Fisher, 'A Group of French Critics' (1897).

Schereschewsky, skēr - ës - kūs'kī, Samuel Isaac Joseph, American Protestant Episcopal bishop: b. Tanroggen, Lithuania, Russia, 6 May 1831. He studied in Russia and Germany, and, after coming in 1854 to the United States, at the Western Theological Seminary (Allegheny, Pa.) and the General Theological Seminary; was ordained deacon of the Protestant Episcopal Church in 1859, priest in 1860, and was a missionary in China in 1860-75. In 1877 he was consecrated third Protestant Episcopal bishop of China, but he resigned his office in 1883, and has since resided in the United States, China, and Japan. With J. S. Burden he translated the Book of Prayer into Mandarin; and he has also prepared a complete revision of the Mandarin Bible (1895), and a wholly new rendering of the Bible into Wenli, the classical language of China (1902).

Schermerhorn, skēr'mér-hörn, Martin Kellogg, American Unitarian clergyman. He was educated at Williams College and at Union Theological Seminary and became a Unitarian minister. He has published: 'Ancient Sacred Scriptures' (1882); 'Sacred Scriptures of the World' (1898); 'Thoughts for the Twentieth Century' (1900); etc.

Scherr, Johannes, German author and literary critic: b. Hohenrechberg, Swabia, 3 Oct. 1817; d. Zurich, Switzerland, 21 Nov. 1886. He was educated at the University of Tübingen and in 1843 settled in Stuttgart, where he became a teacher. He allied himself politically with the Democrats among whom he became a leader; in

1848 he was elected to the assembly and in the revolution of that year he took so prominent a part that he was compelled to flee to Zurich in 1849. He was appointed professor of history and literature in the University of Zurich in 1860, holding the position until his death. His works are characterized by their caustic wit and many peculiarities in point of diction. His writings include: 'Geschichte der deutschen Literatur' (1854); 'Michel, Geschichte eines Deutschen unserer Zeit' (1858); 'Deutsch Kultur und Gittengeschichte' (1852); 'Geschichte der deutscher Frauenwelt' (1860); 'Blücher, seine Zeit und sein Leben' (1862-3); etc.

Schiaparelli, skyā-pā-rē'lē, Giovanni Virginio, Italian astronomer: b. Savigliano 5 March 1835; d. Milan 5 July 1910. He was educated at the University of Turin, and later studied at Berlin, under Encke and at Pultowa, Russia, under Struve. Returning to Italy in 1859, he became assistant astronomer at the Milan Observatory, and its director in 1862. In 1861 he discovered the asteroid Hesperia. His discoveries of the relations between comets and falling stars were published as 'Note e riflessioni sulla teoria astronomica delle stelle cadenti' (1867). In 1877 he published the first accounts of his observations of the "canals" of Mars, to which his name has been given. He published many books on astronomy.

Schiavone, skyā-vō'nā, Andrea (THE SLAVONIAN), Italian painter whose original name was MELDOLLA (MEDOLLA or MEDULA): b. Sebenico, Dalmatia, probably in 1522; d. Venice 1582. Among his works are two parables and two landscapes in the Berlin Museum, 'Christ before Pilate' in the Venice Gallery, 'Christ before Caiaphas' (Vienna), 'Parnassus' (Munich), and numerous other specimens to be seen in collections at Florence, Rome, Naples, Dresden, Paris, and Saint Petersburg. He also etched 119 plates, making use of some soft material, probably tin.

Schiedam, shē-dām', Netherlands, in the province of South Holland, a seaport near the influx of the Schie into the Maas, four miles west of Rotterdam. Of the old walls four gates have been preserved. The town is intersected by numerous canals, and though irregularly built, has broad streets and many good houses. Its chief buildings are the Reformed and other churches, a fine Exchange, town-house, a handsome concert-hall, schools of language, art, business, etc., a public library, and various hospitals. The principal manufacture is the Geneva gin or Hollands; 170 grain and other distilleries are in constant operation. Other manufactures are linen, thread, copper, and iron castings, white lead and litharge, cordage, and vinegar. There is considerable traffic in gin, grain, and coal. Pop. about 30,000.

Schieffelin, shēf'ē-lin, Bradhurst, American druggist and publicist: b. New York 21 Sept. 1824. He entered the wholesale drug manufacture, and in 1860 placed petroleum on the market. During the Civil War he organized a committee of prominent citizens for consultation with and support of President Lincoln, and in the financial troubles succeeding the war was active in charities. With Charles O'Connor and Horace Greeley he formulated the petition in-

roduced into Congress by Roscoe Conkling, for the prevention of the appropriation for the use of religious corporations of public moneys or property.

Schiff, shift, **Jacob Henry**, American banker and philanthropist: b. Frankfort-on-the-Main, Germany, 1847. He came to New York in 1868, where he entered a banking house and became in a few years head of the firm of Kuhn, Loeb & Co. His leadership in finance was quickly acknowledged and his firm has been identified with many prominent enterprises. He has devoted a large portion of his wealth to charitable and educational purposes and among his most noted benefactions are the Semitic Museum at Harvard University, and in New York the Nurses' Settlement, the Young Men's Hebrew Association building, and the Jewish Theological Seminary. He is president of the Montefiore Home for Chronic Invalids of New York, and is an ex-vice-president of the New York Chamber of Commerce. He has long been associated with movements for civic reform.

Schiller, Johann Christoph Friedrich, yō'hān kris'tōf frēd'rīh shīll'ēr, German poet: b. Marbach, Württemberg, 10 Nov. 1759; d. Weimar, Sachsen-Weimar, 9 May 1805. In 1773 he was enrolled at the Karls-schule, a peculiar educational establishment founded by the Duke of Württemberg, originally at Solitude, and later transferred to the capital city of Stuttgart. There he tried the law, which he abandoned for medicine. In 1777, he began to write his 'Robbers' ('Die Räuber')—a composition with many striking faults, but which, nevertheless, awakens a powerful interest. Schiller himself says of it that "he dared to describe men long before he knew anything of them within his grated cell"; but, notwithstanding this, it contains some deep views and admirable displays of character. In 1780, when he had finished his studies, he wrote a treatise entitled 'Essay on the Connection of the Animal and Intellectual Nature of Man,' printed in 1821 in the 'Monatsschrift' of Berlin. In the same year he was appointed physician to a regiment in Stuttgart. His 'Robbers' was printed at his own expense, as he could not find any publisher who would take the risk; and in 1781 he was requested to change the play in certain particulars so as to adapt it for the stage. In January 1782 it was performed at Mannheim, Schiller having willingly made changes wherever he could be convinced that they were improvements. Not being able to obtain leave of absence to go out of the limits of the state he left his regiment without permission, saw his piece performed, and returned with the deepest conviction of the unfitness of his present situation for his talents, particularly as the duke had asked him, after the publication of the 'Robbers,' to show him all his poetical productions, and upon his refusal had prohibited him from publishing anything more except medical works. Having made a second visit to Mannheim to witness the performance of his piece he was on this occasion discovered, and put under arrest. During his detention he formed the plan of his 'Kabale und Liebe' and conceived the idea of his 'Conspiracy of Fiesco.' In 1782 he escaped from Stuttgart and went under an assumed name to Franconia, where he lived

in great solitude in a village called Bauerbach, in order to remain concealed and secure against the possible persecutions of the duke. In this situation he finished his 'Fiesco' and 'Kabale und Liebe.' In 1783 he went to Mannheim, where he was made poet to the theatre, and conceived the idea of 'Don Carlos' and 'Maria Stuart.' During this period he also composed the 'Battle,' the 'Infanticide,' and poems to Laura. In Darmstadt he won the favor of the prince by reading to him some scenes from 'Don Carlos.' In 1785 he went to Leipsic; toward autumn to Dresden, where intercourse with men of talents, the charming scenery, the beautiful gallery, and the library detained him until 1787. Here he became acquainted with the father of the poet Körner. This gentleman afterward wrote a biographical sketch of Schiller. During this period he studied all the works which he could procure relating to the history of Philip II. to prepare himself for his 'Don Carlos'; and these studies led to his 'History of the Revolt of the United Netherlands'—'Geschichte des Abfalls der Vereinigten Niederlande' (1788). His 'History of the Most Remarkable Revolutions and Conspiracies,' of which only one volume was published, was also produced at this period. 'Don Carlos' first appeared at Leipsic, 1787. He himself has written the best and severest critique on this piece in his 'Letters on Don Carlos.' The 'Ghostseer'—'Geisterseher' (1789)—was based on the tales respecting Cagliostro (q.v.). In 1787 Schiller went to Weimar, where Wieland and Herder received him in a friendly manner. In 1788 he met Goethe after the return of the latter from Italy. He did not like him at first: partly through his influence, however, he received in 1789 a professorship of philosophy at Jena. Schiller entered on his office with the discourse, "What is universal history, and for what is it studied?" He now devoted himself to history; and the few poetical productions which he wrote at this period are mostly of a historical character, though the 'Gods of Greece' was composed at this time; and he also then formed the idea of an epic poem, the hero of which was to be Frederick the Great. He paid much attention to philosophy, particularly Kant's; and many of his philosophical and æsthetical treatises date from this period. He lectured on history, and began to publish 'Historical Memoirs from the 12th Century to the Most Recent Times' (1790); and his 'History of the Thirty Years' War' ('Geschichte des dreissigjährigen Kriegs'). The periodical 'Thalia' having ceased in 1793, he formed the plan of publishing, with the co-operation of the first writers of Germany, a new periodical, 'Die Horen' (The 'Horæ' or 'Hours'). He became more intimately acquainted with Goethe, returned with renewed ardor to poetry, and produced, particularly after 1795, the finest lyrical poems which appeared in the 'Horen' and in his 'Almanac of the Muses' (first number in 1796). In 1797 he produced his first ballads. In 1795 he conceived the plan of a play to be called the 'Knights of Malta'; but all his other projects gave way to 'Wallenstein' (completed in 1799). 'Wallenstein's Camp' is a striking introduction to the parts which constitute the proper tragedy. From 1799 he lived in Weimar, where in 1800 and 1801 'Maria Stuart' and the 'Maid of Orleans' ('Die Jungfrau von Orleans') were



STATUE OF SCHILLER, BY BEGAS, BERLIN.

produced. In 1803 appeared the 'Bride of Messina,' and his last dramatic work, 'William Tell.' Death prevented the completion of his 'Pseudo-Demetrius.' He also adapted Shakespeare's 'Macbeth,' Gozzi's 'Turandot,' Racine's 'Phædra,' and other dramatic works, for the German stage. Schiller is second only to Goethe in German literature, and his works have been more extensively read in Germany than those of the more cosmopolitan genius. His dramas still belong to the classic repertoire of the German theatre; despite some superfluous rhetoric in the earlier ones, they remain one of the finest contributions to universal dramatic literature. Of his historical writings the episode of the 'Revolt in the Netherlands' is probably the best, and though superseded for historical purposes by Motley, as a literary performance could scarcely be better. His poems are inferior to Goethe's, perhaps in spontaneity. A complete historico-critical edition of the works of Schiller was published by R. Gödeke (1867-76). His correspondence with Goethe (4th ed., 1881), and that with William von Humboldt (2d ed., 1876), is of great interest. His correspondence with Körner and others has also been published. Fritz Jonas edited seven volumes of his letters in 1892-6, and his 'Geschäftsbriefe' were edited by Gödeke in 1875. There is a biography by Madame von Wolzogen, his sister-in-law (1830), but the standard 'Life' is that of Minor (1890 onward). There are 'Lives' in English by Carlyle and Bulwer-Lytton, and by H. H. Boyesen in his 'Goethe and Schiller.' Some at least of Schiller's works have been translated into almost all European languages. There is an English translation in Bohn's 'Standard Library.' The 'Robbers' has been translated by Lord Woodhouselee (1792), 'Cabal and Love' by M. G. Lewis (1797), 'Fiesco' and 'Don Carlos' by numerous translators, 'Wallenstein' by Coleridge (1800); 'Mary Stuart' and 'William Tell,' and other dramatic works, have also had numerous translators. There may also be mentioned translations of poems and ballads by Bulwer-Lytton (1844), 'Minor Poems' by J. H. Merivale (1884); and other translations by Bowring and Lord Lytton. See DRAMA; GERMAN LANGUAGE AND LITERATURE.

Schiller, in mineralogy, a peculiar lustre due to reflection from the surfaces of minute enclosed crystals, probably of goethite. It is best illustrated by sunstone (q.v.), and is also noticed in bronzite, hypersthene and labradorite.

~ **Schilling**, shil'ling, **Johannes**, German sculptor: b. Mittweida, Saxony, 23 June 1828, and studied art at Berlin and Dresden. In 1868 he became professor at the Dresden Royal Academy. His chief works include the 'Four Seasons' at Dresden, statues of Schiller at Vienna, of Maximilian at Trieste, the War Memorial at Hamburg, and the German National Monument on the Niederwald, opposite Bingen on the Rhine, which bears a colossal figure of Germania.

Schindler, shind'lér, **Solomon**, American rabbi: b. Niesse, Silesia, 24 April 1842. He came to America from Westphalia in 1871, having been for some years out of sympathy with orthodox Judaism, and, after a period of struggle in his adopted country, became known as

one of the leaders of the advance movement among Hebrew religionists. He was called to the congregation of Adeth Israel in Boston, Mass., in 1884. In this pastorate he continued nearly 20 years, during which time he not only helped to liberalize the Hebrew faith but to promote a better understanding between American Hebrews and Christians than had before existed. In 1895 he was made superintendent of the federated Jewish charitable organizations of Boston. He is the author of: 'Messianic Expectation and Modern Judaism'; 'Dissolving Views in the History of Judaism'; etc.

Schinkel, shín'kél, **Karl Friedrich**, German architect and painter: b. Neuruppin, Brandenburg, 13 March 1781; d. Berlin 9 Oct. 1841. He was educated at the gymnasium of his native town, and after 1795, in that of Berlin. He became a pupil of Prof. Gilly, and on the death of the latter in 1798 succeeded to his private practice as an architect. At the same time he continued his studies, and in 1803 he went with this object to Italy, returning in 1805 by way of France to Berlin. The period of the war being unfavorable for architecture, he took to landscape painting, and from 1808 to 1814 painted a series of dioramas for Gropius. On the return of the royal family to Berlin some of his designs for alterations in the palace were adopted and carried out. In 1811 he was admitted to the Academy, and in 1820 became a professor at the Academy. He was the architect of numerous public buildings in Berlin and the provinces. In 1839 he was appointed chief director of public buildings in Berlin. As a painter he produced numerous wall and easel pictures. His 'Primeval History of Mankind' in the vestibule of the Berlin Museum exhibits him to advantage as a wall painter. His landscapes are chiefly architectural views, of which the best known are: the 'Theatre at Taormina'; 'Square of Saint Mark's, Venice'; 'Ocean Caves near Sorrento'; 'The Cathedral at Milan'; 'Interior of Saint Peter's, at Rome'; 'The Capitol by Moonlight.' He exercised a profound influence over every department of the art production of his day, including carpet and furniture making. His taste was strictly classical, but while he reproduced some of the purest forms of Greek art of the Periclean Age, he also occasionally chose the motifs both of mediæval and Renaissance architecture as elements in his designs. These designs, with his own comments and explanations, were published in different forms, his principal work being 'Sammlung architektonischer Entwürfe' (1820).

Schipka Pass. See SHIPKA PASS.

Schipperke. See TERRIERS.

Schirmer, shir'mér, **Johann Wilhelm**, German artist: b. Jülich, Rhenish Prussia, 5 Sept. 1807; d. Karlsruhe 11 Sept. 1863. He studied historical painting under Schadow at the Düsseldorf Academy until he came under the influence of Lessing's landscapes, whereupon he turned to that *métier*, producing historical landscape after the manner of Poussin. In 1830 he became assistant professor and in 1839 professor at the Düsseldorf Academy, meantime visiting and painting in Belgium, the Black Forest, Switzerland, Holland, Normandy, and Italy. In 1853 he became director of the art school at Carls-

ruhe. Among his works are six Biblical landscapes, with the 'Life of Abraham,' National Gallery, Berlin; 'Grotto of Egeria,' 'Nether German Landscape,' Leipsic Museum; series of 26 Biblical landscapes, Düsseldorf Gallery; 'Via Mala,' four landscapes with story of Good Samaritan; 'Storm on the Campagna,' Carlsruhe Gallery.

Schist (crystalline), a metamorphic rock generally found only in regions which have been subjected to regional or dynamic metamorphism, that is, such in which the strata have suffered intense folding and shearing. The general characteristics of schists are the fine and pronounced lamination, and crystalline character of component material. They grade on the one hand into gneisses and on the other into scarcely altered mica slates or sandstones. The more important varieties are broadly classified, according to the principal ferro-magnesian silicate present. Thus we have: (a) Mica schists; (b) Hornblende schists or Amphibolites, and (c) various minor schists. The mica schists range in silica from over 80 per cent to less than 50 per cent, according to the amount of quartz present. The most prominent and abundant minerals of this variety are quartz, muscovite, and biotite, which are more or less distributed in layers. Among the other minerals present are: feldspars, both orthoclase and plagioclase, the rock thus approaching gneiss; garnet, often in large and well-formed crystals; staurolite, cyanite, sillimanite, tourmaline, varying from black through blue, green, red, to white, often of the precious type; opalite, pyrite, and magnetite. The term Hydromica schists is used commonly for the finer varieties, in which the scales of mica are indistinguishable (sericite, peragonite, etc.). These pass imperceptibly into phyllites. Mica schists result largely from the metamorphism of sandstones, shales and clays, but also through crushing and excessive shearing of igneous rocks. They are found over wide areas in New England, the Appalachians, Lake Superior, and the West. The Hornblende schists or Amphibolites generally result from the dynamic metamorphism affecting igneous or pyroclastic rocks, and rarely from ordinary sedimentary rocks. Hornblende here takes the chief place, quartz being normally absent, while biotite and the basic feldspars are characteristic constituents. Garnet, magnetite, pyrite, and other basic minerals are also common. These schists occur as belts in other metamorphic rocks, generally representing dikes, sheets, flows, or ash beds in the sedimentary series. They occur in New England and other Eastern States, and are important in the mineral regions of Lake Superior. They also occur in the Black Hills, and in the Rocky Mountain and California ranges. Among the minor schists may be mentioned: Chlorite schist, Talc schist, Epidote schist, and others. In each of these, the mineral giving name to the rock is more or less admixed with quartz, feldspars, and numerous other minerals. They probably result most commonly from the alteration of igneous rocks, and are found in the older metamorphic districts. See FOLIATION; METAMORPHISM.

Schizaea, *ski-zé'a*, the typical genus of the *Schizaceae*, ferns widely distributed, mostly in tropical regions, and which are small and distinct in habit. The sporangia have an entire

apical ring and are sessile in close distichous spikes along the middle veins of the narrow pinnæ of the fertile fronds; the sterile fronds are linear, fan-shaped, or dichotomously many-cleft. *S. pusilla*, the curly-grass, is the only species in North America, and is very rare and local, being found only in the pine-barrens of New Jersey and Nova Scotia. Its fertile one-sided fronds form the most conspicuous part of this tiny plant, the twisting linear sterile fronds being very like grass. See FERNS AND FERN ALLIES.

Schizop'oda. See CRUSTACEA; OPOSSUM-SHRIMP.

Schlatter, *shlät'tër*, **Michael**, American German Reformed clergyman: b. Saint Gall, Switzerland, 14 July 1716; d. near Philadelphia, Pa., November 1790. He was educated at the University of Helmstedt, taught for several years, and then entered the German Reformed ministry. He offered his services as a missionary to the German Reformed emigrants in Philadelphia in 1746 and went to Pennsylvania in that year. He served as pastor of the united churches of Germantown and Philadelphia in 1746-51, organized a synod which met in Philadelphia in 1747, and made extended missionary tours through Pennsylvania, Maryland, Virginia, New Jersey, and New York. He visited Europe in 1751, secured a much needed reinforcement of six young preachers, substantial aid in the way of money, and returned in 1752. As a result of his appeal £20,000 was raised in England and Holland for the establishment of schools among the Germans in America, and in 1755 Schlatter became superintendent of the enterprise, but in 1757 he resigned because of the opposition encountered from the Germans, who objected to the teaching of the English language in the schools. In 1757 he was appointed chaplain of the Royal American regiment, and remained with the army until 1759. He then preached at Chestnut Hill and surrounding places. In 1777, while still attached to the royal army, he refused to obey orders on account of sympathy with the colonial cause and was imprisoned. Consult Henry Harbaugh, 'Life of Rev. Michael Schlatter' (1857).

Schlegel, *August Wilhelm*, *ow'goost vil' hēlm shlā'gēl, von*, German critic and poet: b. Hanover 8 Sept. 1767; d. Bonn 12 May 1845. He was educated at the University of Göttingen, where he became the friend of Bürger, who in a sonnet prefixed to the second edition of his poems consecrated Schlegel to the service of the Muses and prophesied his immortality. After leaving Göttingen he was tutor for three years in the family of a banker in Amsterdam. Returning to Germany and settling at Jena he contributed to the 'General Literary Gazette,' his translations from Dante, accompanied by comments, attracting particular attention. In 1797 he began his translations of Shakespeare, and carried on the work with the assistance of Tieck, who aided in the revisions. This translation had the effect of making Shakespeare almost as well known in Germany as he was in England, and a revised edition of this translation has been issued by the German Shakespeare Society. Of this collection 17 plays only were the work of Schlegel; the remainder were trans-

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lated by Graf Wolf Baudisson and Dorothea Tieck. The atmosphere and spirit of the Elizabethan drama is faithfully reproduced; and the English blank verse transmuted into the German iambic metre of five feet so successfully that this metre was thereafter generally employed for dramatic purposes. In 1797 Schlegel had become professor at Jena, where he delivered lectures on æsthetics, and from 1798 to 1806 was connected with his brother in the publication of the 'Athenæum.' His articles in this as well as those contributed to Schiller's periodicals, the 'Horen' and 'Musenalmanach,' were among the most influential factors of the growing romantic movement. In 1802 he lectured in Berlin on art and literature, and meantime his poetic attack on Kotzebue (1800) had appeared, also his 'Characteristics and Critiques' (1801), and 'Almanac of the Muses' (1802), published conjointly with Tieck. In 1803 he issued Vol. I. of the 'Spanish Theatre,' containing his translations of Calderon, marked by the same perfection of rendering as characterized his Shakespeare. Later renderings from Italian, Spanish, and Portuguese poetry followed, and in 1804 he became traveling tutor in the family of Mme. de Staël, with whom he lived in Switzerland and traveled in Italy, France, and Scandinavia. This association was mutually beneficial; for Schlegel it was a time of critical productiveness, and for Mme. de Staël a source of many of the ideas later embodied in her book on Germany. In 1807 he established his reputation in France by his comparison, written in French, of the 'Phædra' of Euripides with that of Racine. In 1808 he delivered in Vienna his lectures on dramatic art and literature. This work, 'Vorlesungen über dramatische Kunst und Literatur' (1809-11), was published and translated into most of the languages of Europe and probably stands as Schlegel's most permanent contribution to critical literature, though the limitations of his sympathies render his judgments of the French drama of less value than those of the Greek and English. In 1813-14 he was secretary to the Crown Prince of Sweden, after which he joined Mme. de Staël and remained in her household until her death in 1817. It was during this period that she wrote 'De l'Allemagne.' In 1818 he became professor at the University of Bonn, where he lectured on the history of the fine arts and sciences in ancient and modern times. He superintended the printing of the 'Rāmāyana' in Sanskrit, and in 1823 published the 'Bhagavad-Gītā,' a portion of the Indian epic 'Mahābhārata,' with a Latin translation. In 1827 he delivered lectures in Berlin on the fine arts and in 1832 published 'Reflections on the Study of the Asiatic Languages.' As a poet his work has small value as his genius was not creative. His shorter poems were first published in 1800. A classical tragedy 'Ion' (1803) failed, even though Goethe tried to win recognition for it. Consult: Haym, 'Die Romantische Schule' (1870); Hettner, 'Die Romantische Schule' (1850); Bernays, 'Zur Entstehungsgeschichte des Schlegelschen Shakespeare' (1872); Minor, 'A. W. Schlegels Vorlesungen über schöne Litteratur und Kunst' (1884); D. Fr. Strauss, 'Kleine Schriften.'

Schlegel, Karl Wilhelm Friedrich von, German critic and litterateur, brother of A. W.

Schlegel: b. Hanover 10 March 1772; d. 11 Jan. 1829. He studied at Göttingen and Leipsic, and was a voracious reader of the classics. His earliest works of importance were 'Ueber das Studium der griechischen Poesie' (1796); and 'Die Griechen und Römer' (1796). These works, showing the influence of Schiller, were attempts to define the nature of classical in comparison with modern literature. In 1800 he became privat-docent at Jena, and at this period contributed to the 'Athenæum,' which he conducted with his brother August Wilhelm; wrote his romance 'Lucinda,' a repudiated product of the romantic school; and a tragedy 'Alarcos' (1802), which met with no better success than his brother's 'Ion.' In 1802 he went to Paris, where he delivered lectures on philosophy; edited a monthly periodical called 'Europa' and began the study of the Sanskrit language and literature. The fruits of his Indian studies were given to the world in 'Ueber die Sprache und Weisheit der Indier' (1808). Upon his return to Germany he embraced the Roman Catholic faith. In 1808 he went to Austria and in the year following became imperial court secretary at the headquarters of Archduke Charles. At a later period, having gained the confidence of Prince Metternich by various diplomatic papers he secured the appointment as Austrian counselor of legation at the Diet of Frankfort. Meantime he had delivered two other courses of lectures at Vienna, published as 'Ueber die neuere Geschichte' (1811) and 'Geschichte der alten und neuen Litteratur' (1815). In 1818 he was again at Vienna, where he served as secretary of the court and counselor of legation. His later works include 'Philosophie des Lebens' (1828) and 'Philosophie der Geschichte' (1829). As a critic Friedrich was more enthusiastic and less balanced than his brother Wilhelm. He had less of a talent for impersonal comparison, and was apt to allow his judgment to be biased by prejudice. After the period of his conversion to Catholicism this peculiarity was especially noticeable. Together the Schlegel brothers performed a valuable work. In criticism their work was interpretative instead of antagonistic. The breadth of their culture enabled them to co-ordinate racial forces as manifested in literature and realize Goethe's idea of a 'Weltlitteratur.' The wife of Friedrich was the daughter of Moses Mendelssohn. She was clever but eccentric, and was the author of several works published under her husband's name, such as the unfinished romance 'Florentin' (1801); 'Sammlung romantischer Dichtungen des Mittelalters,' Vol. I. (1804), and 'Lothar und Maller' (1805). Consult: Haym, 'Die romantische Schule' (1870); Dilthey, 'Schlegelmacher' (1870); Minor, 'Fr. Schlegels prosaische Jugendschriften' (1882).

Schleich, shlīn, Eduard, Bavarian landscape painter: b. Harbach 12 Oct. 1812; d. Munich 8 Jan. 1874. He was self-taught, having been dismissed from the Munich Academy as without talent. He studied nature at close range in the Bavarian Alps, the Tyrol, and northern Italy, and as painted by the old masters in the Munich galleries; and became, after Rothman, the most distinguished landscape painter of the Munich school. Among his canvases, of which there are a great number, may be cited

'Evening Landscape,' in the Berlin National Gallery; 'The Alps in Tyrol,' in the Carlsruhe Gallery; 'Cattle Herd,' in Dresden Gallery; 'Isar Meadows,' in Königsberg Museum; 'Storm Near Coast,' in Munich; 'Venice by Moonlight,' in Schack Gallery, Munich; 'Moonlight Near Rotterdam,' in Nuremberg.

Schleicher, shli'ēr, August, German philologist: b. Meiningen 19 Feb. 1821; d. Jena 6 Dec. 1868. He devoted himself to the study of theology and Oriental languages, first at Leipsic and afterward at Tübingen. In 1846 he took the degree of doctor of philosophy at Bonn, and soon after qualified himself as a teacher of philology, to which he ever after devoted himself. In 1850 he was called to Prague as extraordinary professor of philology, a chair soon exchanged for that of comparative philology. At Prague he made himself more fully acquainted with the Slavonic languages and undertook a several months' journey to Lithuania in order to learn the Lithuanian language. In 1857 he accepted the appointment of honorary professor of the science of language and Old German philology in the University of Jena, where he continued until his death. He published a work on the comparative history of languages, 'Zur vergleichenden Sprachengeschichte' (1848); and another containing a systematic review of the European languages, 'Die Sprachen Europas' (1850). Later works are: 'Die Formenlehre der kirchenslawonischen Sprache, erklärend und vergleichend dargestellt' (1853); 'Handbuch der litauischen Sprache' (1856-7); 'Zur Morphologie der Sprache'; 'Die deutsche Sprache' (1860); 'Kompendium der vergleichenden Grammatik der indogermanischen Sprachen'; 'Die Darwinische Theorie und die Sprachwissenschaft'; 'Ueber die Bedeutung der Sprache für die Naturgeschichte des Menschen' (1865).

Schleiden, shli'dēn, Matthias Jakob, German botanist: b. Hamburg 5 April 1804; d. Frankfurt 23 June 1881. He was educated for the law in Heidelberg, but in 1833 took up the study of botany. He occupied the chair of botany at Jena from 1839 to 1863, when he was called to the Botanical Gardens at Dorpt. He was one of the first botanists to study plant tissue, and his name is associated with that of Nageli, the Swiss botanist, in the early development of the cell theory. His works include: 'Grundzüge der wissenschaftlichen Botanik' (1842-3), translated into English as 'Principles of Scientific Botany' (1849); 'Die Pflanze und ihr Leben' (1848); 'Baum und Wald' (1870); 'Die Rose' (1873).

Schleiermacher, shli'ēr-mān-ēr, Friedrich Ernst Daniel, German theologian and philosopher: b. Breslau 21 Nov. 1768; d. Berlin 12 Feb. 1834. He was educated by the Moravian Brethren at Niesky. In 1787 he began at Barby the study of theology, and went to Halle to continue it. In 1794 he was ordained and appointed assistant preacher at Landsberg on the Warthe. From 1796 to 1802 he was chaplain in the Charité-Haus at Berlin. During this period he translated Fawcett's Sermons (two volumes), contributed to the 'Athenaeum' conducted by the two Schlegels, and wrote the 'Discourses on Religion,' and the 'Monologues,'

and 'Letters of a Minister out of Berlin.' In 1802 he published his first collection of sermons, which was followed by two others. In 1802 he removed to Stolpe, where he wrote his 'Critical View of Ethics.' In 1804 he was appointed extraordinary professor of theology at Halle. In 1807, when Halle was separated from Prussia, he went to Berlin, and lectured there, as well as preached. In 1809 he was appointed preacher at the Trinity Church in Berlin; and in 1810, when the new university was opened in that city, he was appointed ordinary professor, as he had been at Halle during the last part of his residence there. In 1811 he was elected a member of the Academy of Sciences, and in 1814 secretary of the philosophical class. His advocacy of doctrinal liberty as a basis of union between the Lutheran and Reformed Churches procured him the disfavor of the government. Schleiermacher was, according to Zeller, the greatest theologian of the Protestant Church since the time of the Reformation. His theological views were entirely based on philosophical reasoning, and were somewhat vague and speculative. He held religion to be based on feeling, and was opposed to insistence on dogmatic forms. Philosophical and theological views of God are, according to him, derived by different methods, and are not dependent on each other, each having its own validity, with which the other does not interfere. His 'Life of Christ' is in important respects an anticipation of Strauss'. Schleiermacher's philosophical studies from 1786-96 were chiefly directed to Kant. Schleiermacher did not develop a complete logical system of philosophy. His views were delivered chiefly in the form of modifications of the Kantian and other systems. Space and time, as well as the categories of Kant, Schleiermacher held to be forms of things themselves, and not merely the subjective forms of our apprehension of them. He recognized with Kant the element of spontaneity in thought, but he held the unity of conception to be a true objective unity, not an empirical creation of the mind. Thus he held the various processes of nature and mind in the world to constitute a unity of manifold existences, not invented by the mind, but having a real existence. All positive affirmations with reference to the Deity he held to be figurative and anthropomorphic. He amended Kant's conception of ethics by making the duty of the individual vary with his individuality. The highest good he defined as the supreme union of the real and the ideal. His works have been published in three series — 'Theology,' 'Sermons,' and 'Miscellaneous and Philosophical Writings' (Berlin, 1835-64). Consult: Erdmann, 'History of Protestant Theology' (1871); Lichtenberger, 'History of German Theology in the 19th Century' (1889); Pfeiderer, 'Protestant Theology in Germany since Kant' (1890).

Schleswig, shlāz'vīg, Germany, a seaport in the province of Schleswig-Holstein at the head of the Schlei, 29 miles northwest of Kiel. It resembles a Dutch town in point of architecture, and is divided into three parts — the Altstadt, or Old Town, the Lollfuss, and the Friedrichsberg. The only square is the marketplace in the Altstadt. The principal street, two miles long, is in the Lollfuss. The buildings

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of importance are the three churches, of which the cathedral (12th century) is a fine Gothic pile, with a tower 368 feet high. Other buildings are the old castle, various benevolent institutions, and the Convent for Noble Women. At the south are the remains of a wall erected by pagan kings, against the invasion of Jutlanders. Trade and manufactures are unimportant. There are seven annual fairs. Pop. about 20,000.

Schleswig - Holstein, shláz'vīg - hōl'stīn, Germany, a maritime province of Prussia, between Denmark on the north; the Baltic, Lübeck, and Mecklenburg on the east; Mecklenburg and the territory of Hamburg on the south; Hanover southwest, and the North Sea, on the west. It covers an area of 7,337 square miles. Schleswig is separated from Holstein by the Eider and the Schleswig-Holstein Canal. The province includes several islands in the Baltic and North Seas, and belongs to the great North German plain. Helgoland belongs to the province. The hilly district on the eastern coast contains the most productive land in the province; the central part is nearly barren, the western coast is protected by many dikes, and is fertile. The Baltic coast, about 300 miles long, is hilly and contains numerous fjords which make excellent harbors. The North Sea coast is low and flat. The Elbe forms the boundary on the south for 65 miles. The Eider is the principal river. Other rivers are the Trave and Stör. There are numerous lakes in the north-east, chief of which are Witten-See and Gotteslogs-See. The chief occupations of the inhabitants are agriculture and stock-raising. The majority of the occupants of Schleswig are Danish; of Holstein, German. The industrial works include sugar factories, breweries, and distilleries. The principal ports are Altona, Helgoland, Kiel, Flensburg, Neumühlen, Sonderburg, Wyck, and Tönning, and the capital, Schleswig. The province became a united duchy in 1386. By the treaty of Prague, North Schleswig was to choose between Denmark and Prussia, but the privilege has been ignored. Its history is a record of continuous strife between Danes and Germans, closing in favor of the latter. The united government of Holstein and Schleswig was first recognized by Margaret of Denmark in 1386, and the basis of this union was the Succession Act, and the practical contradiction between their feudal duty and their own inseparable connection gave rise to the celebrated "Schleswig-Holstein question," causing interminable separations and fusions. Though a long time subject to Danish sovereignty the sentiment of patriotism for Germany gradually grew until finally the province was incorporated in the German Confederation.

Schley, sli, Winfield Scott, American naval officer; b. near Frederick, Md., 9 Oct. 1839; d. New York 3 Oct. 1911. He was graduated at the U. S. Naval Academy in 1860, and went as midshipman on the *Niagara* to China and Japan. Returning in 1861, he was made master, served on the *Winona* in the West Gulf blockading squadron, later on the *Monongahela* and the *Richmond*, and participated in all the engagements which led to the capture of Port Hudson in 1863, having been promoted to the rank of lieutenant in 1862. Ordered from Southern wa-

ters in 1864 to the Pacific squadron, he served on the *Wateree* as executive officer till 1866, when he was promoted lieutenant-commander. In this period he suppressed an insurrection of Chinese coolies on the Chincha Islands, and for protection of United States interests landed a body of men at San Salvador during a revolution. From 1866 to 1869 he was instructor at the Naval Academy; then, being assigned to the Asiatic station, served there on the *Benicia* for three years, earning distinction at the taking of the Korean forts on the Salee River in 1871. Again, in 1872, he was detailed as instructor at the Naval Academy, and in 1874 was made commander. After serving in Europe and on the west coast of Africa, he commanded the *Essex*, on the Brazil station, 1876-9. He was selected to command the third government relief expedition (1884) for the rescue of Lieut. A. W. Greely (q.v.), which he promptly accomplished. Having served (1885-9) as chief of the Bureau of Recruiting and Equipment, he was promoted captain in 1888. From 1889 to 1891 he was in the Southern Pacific as commander of the cruiser *Baltimore*, and in the latter year interposed at Valparaiso, Chile, when American sailors were assaulted in the streets.

In 1895 he was placed in command of the New York; was chairman of the Lighthouse Board 1897-8; in February of the last-named year became commodore; and after the outbreak of the war with Spain was given command of the Flying Squadron. Sailing from Hampton Roads 13 May 1898, he began the historic search for Cervera's Spanish fleet, discovered it and finally established a blockade of the harbor at Santiago de Cuba (see UNITED STATES, *War with Spain*), where, on 29 May, Cervera (q.v.) was found to be. Schley's squadron was united 1 June with the fleet under acting Rear-Admiral W. T. Sampson (q.v.), and the blockade was continued until 3 July, when the Spanish ships came out of the harbor and were destroyed by the American vessels, which, during the temporary absence of Sampson, were under the immediate command of Commodore Schley, on board the *Brooklyn*. In August 1898 Schley was raised to the rank of rear-admiral.

An unfortunate controversy arose between partisans of Schley and those of Sampson over their respective claims to the credit of this great victory. Of that discussion neither officer personally took public notice until after the appearance of a work by Edgar Stanton Maclay (q.v.), entitled 'History of the United States Navy,' in which the author referred to Commodore Schley as a 'caitiff, poltroon, and coward.' The proofs of the book had been read and approved by various naval officers, among them Rear-Admiral Sampson; and on 22 July 1901 Schley applied to the secretary of the navy for a court of inquiry. This request was granted 24 July. The court was convened 12 September, and its sessions continued for one month. It consisted of Admiral Dewey, president, and Rear-Admirals Benham and Ramsay. The verdict, returned 14 Dec. 1901, was a disagreement, Admiral Dewey refusing to subscribe to censures on Schley's conduct which were made by the two other members. The "majority" report, signed by two members only, found Schley

guilty of vacillation, lack of enterprise, and disobedience, and in other particulars strongly criticised his conduct, both before and during the battle of Santiago de Cuba, while recognizing his personal courage in the action. Admiral Dewey, however, presented a "minority" report, in which he praised Schley for promptness and efficient service, and gave him the credit for the destruction of Cervera's fleet. Schley filed with the secretary of the navy objections to the "majority" report, but it was nevertheless approved by Secretary Long, 20 Dec. 1901. In January 1902, Rear-Admiral Schley appealed from the verdict to the President, who, however, confirmed Secretary Long's approval. On recommendation of the court, no action was taken upon its findings. Schley's retirement from active service at the age limit occurred 9 Oct. 1901. In collaboration with J. R. Soley (q.v.), he wrote 'The Rescue of Greely' (1886).

Schlich, shlik, William, English forester: b. Darmstadt 1840. He was educated at Darmstadt and the University of Giessen and was appointed in 1866 to the Indian Forest Department. He held the offices of conservator of forests, 1871, and inspector general of forests, 1881; and organized the first school of forestry in England, at Cooper's Hill, in 1885. He was made F.R.S. in 1901. He is the author of: 'A Manual of Forestry' (5 vols.); 'The Outlook of the World's Timber Supply'; 'Afforestation in Great Britain and Ireland.'

Schliemann, Heinrich, hin'rin shlé'mān, German archaeologist: b. Neubuckow (Mecklenburg-Schwerin) 6 Jan. 1822; d. Naples 27 Dec. 1890. He spent five years as a pupil in retail business in Fürstenberg, then embarked as cabin-boy on board a ship bound for Venezuela. The ship was wrecked on the coast of Texel, but Schliemann was saved and taken to Amsterdam. Here he obtained a post in a commercial house and set himself to acquire a thorough knowledge of the chief European languages. In 1846 he was sent to Saint Petersburg as agent for another Amsterdam firm. By 1856 he had learned modern Greek and begun the study of ancient Greek, and in 1858-9 traveled in Sweden, Denmark, Germany, Italy, Egypt, Syria, and Greece. Having amassed a considerable fortune in trade, he retired from it in 1864 in order to devote himself wholly to archaeological studies. He traveled round the world in 1864-6, and in 1868 went to the coast of Asia Minor by way of Corfu and the Morea. In 1870 he undertook at his own cost the excavation of the heaps of ruins at Hissarlik, in the Troad, which he believed to be the site of ancient Troy (q.v.). These excavations he carried on with interruptions until 1890. Contrary to agreement with the Porte, he retained possession of all the spoils discovered there, and was compelled by the Greek courts to pay the sum of \$10,000. He presented his collections to the Museum für Völkerkunde at Berlin. In 1876 he began similar excavations at the site of ancient Mycenæ in Greece. Little confidence was at first placed in his methods by trained archaeologists, and when his discoveries had been made their historical value was for a time doubted. But scholars now generally agree that they at-

test powers adequate to the Trojan war, and made the traditional account probable in its main outlines.

Schlosser, Friedrich, Christoph, fréd'rin krës'töf shlös'sër, German historian: b. Jever, Oldenburg, 18 Nov. 1776; d. Heidelberg 23 Sept. 1861. He studied at the University of Göttingen 1794-8, and published his first history, 'Geschichte der bildersturmenden Kaiser des Oström' in 1812. He was professor in the Lyceum of Frankfurt 1812-14 and city librarian until 1819, when he was called to Heidelberg as professor of history at the university, a position retained until his death. Schlosser's writings, which are characterized by a great love of truth and a high moral tone in judgment, include 'Weltgeschichte in zusammenhängender Erzählung (1817-24)'; 'Geschichte des 18. Jahrhunderts' (1823); 'Universal-historische Uebersicht der Geschichte der alten Welt und ihre Kultur' (1824-34).

Schlözer, shlét'sër, August Ludwig von, German historian: b. Gaggstedt, Württemberg, 5 July 1755; d. Göttingen, Germany, 9 Sept. 1809. He was educated at Wittenberg and at Göttingen, was engaged for several years as a tutor in Stockholm and later visited Russia, where he mastered the language as he had also done in Sweden. In 1765 he was appointed to the chair of political science at Göttingen, which he occupied until his death. His publications include: 'Allgemeine Nordische Geschichte' (1772); 'Weltgeschichte im Auszuge und Zusammenhange' (1792-1801); translation of Nestor's 'Russian Chronicles' (5 vols., 1802-9); etc.

Schlüter, shloo'tër, Andreas, German sculptor and architect: b. Hamburg 20 May 1664; d. Saint Petersburg 1714. His father was a sculptor and brought him in early life to Dantzic. He left that place for Marschau, where he opened a studio as a sculptor and eventually (1694) settled in Berlin. The Baroco style of architecture, then popular in Holland, attracted his fancy and in this style he began (1696) to make designs for rebuilding the royal residences. Before carrying them out, he took a journey through Italy, where he built the central front of the castle at Charlottenburg, and subsequently began the restoration of the royal castle at Berlin and became actively engaged in designing buildings of this class in other parts of the country. He eventually removed to Saint Petersburg and became court architect to Frederick the Great. Among the statues he erected in Berlin are the statue of the grand elector (cast by Jacobi in 1700). Besides the bronze statue of the Grand Elector Frederick III. at Königsberg, the tomb of Frederick I. and his wife in Berlin, and the marble screen in the church of Saint Mary, he produced numerous designs for the gorgeous interior decoration of the Goldsmiths' Hall, Berlin, and other buildings. Consult Adler, 'Andreas Schlüters Leben.'

Schmalkalden, shmäl'käl'dën, Articles of, a new Protestant confession which was drawn up at the instance of John Frederick, elector of Saxony, by Luther and other divines, and signed at Schmalkalden in February 1537. These articles were essentially the same as those of the

SCHMALKALDIC LEAGUE—SCHNORR VON KARLSFELD

Confession of Augsburg, but in much stronger language. See REFORMATION, THE.

Schmalkaldic League, the league formed at the close of 1530 by the Protestant princes of Germany, assembled at Schmalkalden, to resist the aggressive measures contemplated by the Emperor Charles V. It ultimately included the whole of northern Germany, Saxony, Würtemberg, and Denmark, with portions of Bavaria and Switzerland. The object of the league was the common defense of the political and religious freedom of the Protestants, and the confederacy was first intended to continue only for six years, but subsequent events induced them in 1535 to renew it for another period of 10 years, and to raise a permanent army to carry out the objects of the league. About this time it was joined, among others, by the king of France, Francis I., though only from political motives, and Henry VIII. of England declared himself its protector. The confederacy received a fuller consolidation by a new Protestant confession, drawn up at the instance of John Frederick of Saxony by Luther and other divines, and known as the Articles of Schmalkalden, from the circumstance of their having been signed (1537), like the league itself, at the town of Schmalkalden. These articles were essentially the same as those of the Confession of Augsburg. The league was latterly crippled by mutual jealousy and the conflict of interests, and its early successes in the so-called Schmalkaldic war were ultimately more than outweighed by the complete rout at Mühlberg and the capture of John Frederick. The ends of the league, however, were ultimately gained through the instrumentality of Duke Maurice, now elector of Saxony, who in 1552 declared war against the emperor, and forced him in 1552 to grant the Treaty of Passau, which secured the religious liberty of the Protestants. See also, CHARLES V.; REFORMATION, THE.

Schmauk, småk, Theodore Emmanuel, American Lutheran clergyman: b. Lancaster, Pa., 1860. He has engaged principally in editorial work, was editor-in-chief of the 'Lutheran Church Review' in 1892 and since 1889 has been literary editor of the 'Lutheran.' He has published: 'The Negative Criticism of the Old Testament' (1894); 'History of Old Salem and Lebanon' (1898); 'The Early Churches of the Lebanon Valley' (1902); 'The History of the Lutheran Church' (1903); etc.

Schmid, shmît, Matthias, Austrian painter: b. See, Tyrol, 14 Nov. 1835. He studied at the Munich Academy (1856) under Schrandolph, and was a pupil of Piloty (1869), when the persecution to which the clergy subjected him on account of his liberal views caused him to leave Tyrol. He won the Vienna Medal in 1873. Among his canvases are 'The Entombment'; 'The Flight into Egypt'; 'The Judge of Morals' (1873); 'Festival of the Parson's Cook' (1874); 'The Betrothal' (1879); 'Repairing the Damage' (1882); 'Blind Man's Buff' (1884); 'Forsaken' (1885); 'In the Picture Gallery' (1886). He has also done in fresco at the Innsbruck Cemetery, 'The Three Marys at Christ's Tomb' (1859).

Schmidt, Johannes, German philologist: b. Prenzlau 29 July 1843; d. Berlin 4 July 1901.

After study at the University of Bonn, he was there made professor (1873), in the same year removed to Grätz, and from 1876 until his death was at Berlin. In 1884 he was elected to the Prussian Academy of Sciences. Probably he was not excelled by any scholar of his time in an extensive scientific knowledge of the grammar of the Indo-European group of languages. From 1875 he edited (with Kuhn) the 'Zeitschrift für vergleichende Sprachforschung.' Among his more important works are: 'Zur Geschichte des indogermanischen Vokalismus' (1871-5); 'Die Verwandtschaftsverhältnisse der indogermanischen Sprachen' (1872); 'Die Pluralbildungen der indogermanischen Neutra' (1889); and 'Kritik der Sonantentheorie' (1895).

Schmidt, shmît, Nathaniel, American instructor: b. Hudiksvall, Sweden, 22 May 1862. He was educated at the universities of Stockholm, Colgate, and Berlin. He became professor of Semitic languages and literature at Colgate University in 1888 and in 1896 accepted a similar chair at Cornell, which he still holds. He has published: 'Introduction to the Hexateuch' (1896); 'Biblical Criticism and Theological Belief' (1897); 'The Republic of Man' (1899), and outline histories of Egypt, India, and Syria (1901-2).

Schnetz, Jean Victor, zhôn vek-tôr shnêts, French painter: b. Versailles 15 May 1787; d. Paris 17 March 1870. He began his art studies under the painter David. His first large picture was 'The Good Samaritan' (1819, in the cathedral at Valence), which was followed by 'Jeremiah Weeping over the Desolation of Jerusalem.' While residing in Italy he painted several genres from incidents in peasant life, and some historical pictures of which the most notable were 'Jeanne d'Arc' (1835); 'The Constable Montmorency at the Battle of Saint-Denis' (1836); and 'Mazarin on His Deathbed.' His finest historical painting is his 'Saint Elizabeth,' now in the church of Notre-Dame des Bonnes Nouvelles. In 1840 he was appointed director of the French school at Rome and held the position for 18 years.

Schnitzer, shnît'sër, Edward. See EMIN PASHA.

Schnorr von Karolsfeld, shnôr fôn kär-ôls-fêlt, Julius, German painter: b. Leipsic 26 March 1794; d. Dresden 24 May 1872. His father was a painter and initiated him into the rudiments of art. In 1811 he proceeded to Vienna, and while there produced several works. In 1817 he visited Italy, spent a year at Florence, and then took up his residence at Rome. Here he attached himself to the 'Nazarenes,' then under the leadership of Cornelius and Overbeck. His painting 'The Wedding in Cana' attracted so much notice that he was chosen, along with the two painters already named, to paint the walls of the Villa Massimi at Rome. Among other works produced by him at Rome are 'Jacob and Rachel'; 'Ruth and Boaz'; 'The Flight into Egypt,' and 'Children brought to Jesus.' He removed to Munich in 1827, and was appointed professor of historical painting in the Academy of Fine Arts there. He was next commissioned to decorate the new palace with frescoes of scenes from the national poem of the 'Nibelungenlied'; and adorn the Fest-

saalbau with incidents in the lives of Charlemagne, Frederick Barbarossa, and Rudolf of Hapsburg. These are perhaps the most popular of modern works in fresco in Munich. In 1846 he became director of the picture-gallery and professor at the Academy of Fine Arts in Dresden. While here he completed his illustrations of the Bible, 'Die Bibel in Bildern' (1852-60). They exhibit wonderful animation, variety, and power. To the Dresden period also belong the oil-painting of 'Luther at the Diet of Worms,' and the designs for a window for Saint Paul's, London. This window represents scenes from the life of Saint Paul.

Schod'de, George Henry, American scholar: b. Allegheny, Pa., 15 April 1854. He was graduated from Capital University 1872 and from Leipsic University 1877, and now occupies the chairs of Greek, Hebrew, and theology at Capital University, Columbus, Ohio. He has published 'The Protestant Church in Germany' (1903); and has translated 'The Book of Enoch' and 'The Book of Jubilees,' from the Ethiopic, and 'Day in Capernaum' from the German of Delitzsch.

Schoeborn, shé'börn, August, American architect: b. Germany about 1827; d. Washington, D. C., 25 Jan. 1902. He came to Wisconsin in 1849, but later removed to Washington, D. C., where until his death he was a member of the staff of the architect of the Capitol. In Civil War time he drafted plans of barracks, hospitals, and forts for the quartermaster-general's department, and maps and plans for the use of Gen. McDowell.

Schoeffer, shéf'fër, Peter, German printer: b. Germersheim, near Mentz, about 1430; d. about 1502. At about the age of 20 he was a student at the University of Paris, and a copyist. It seems likely that Gutenberg taught him what he knew of printing and employed him in his establishment at Mentz. After Fust and Gutenberg dissolved partnership Schoeffer was connected with the former, and the two names are associated on the imprint of the 'Book of Psalms,' printed in 1457. The reputation of his being the inventor of matrices and the type-mold got abroad during his lifetime and was aided by his own artful insinuations; but modern research has disproved his claim to the work done by Gutenberg. He followed the career of printer after the death of his partner Fust, and issued many works alone. He was succeeded by three sons who became eminent printers. Consult De Vinne, 'The Invention of Printing' (1876).

Schoenfeld, shén'fêlt, Hermann, American educator: b. Oppeln, Prussian Silesia, 21 Jan. 1861. He was educated in the universities of Berlin, Breslau, and Leipsic, and in 1888 accepted a call as instructor in modern languages at Providence, R. I. He was engaged there and at New Bedford, Mass., until 1891 when he went to Johns Hopkins. In 1893-4 he was United States consul at Riga, Russia, and delegate of the United States bureau of education to investigate methods of higher education in Poland. He returned in 1894 and has since been professor of Germanics and Continental history at Columbian University. He has published: 'Brant and Erasmus' (1892); 'Higher Educa-

tion in Poland' (1896); edited Schiller's 'Maria Stuart' (1899); 'Bismarck's Letters and Orations' (1903); etc.

Schoenleber, shén'lâ-bër, Gustav, German painter: b. Bietigheim, Württemberg, 3 Dec. 1851. He studied under Kurtz in Stuttgart and Adolf Lier in Munich, and traveled in Italy and Holland, in the latter country especially finding congenial themes for his landscape art. He reproduced the tender tints of the flat, moist land with now and then a church steeple or a clump of trees as a diversifying feature. In 1880 he was made professor at Carlsruhe. Among his works are 'Harbor of Genoa' at Rotterdam; 'Venetian Fishing Boats' at Hamburg Gallery; 'View of Flushing at Low Tide' (1881), Dresden Museum; 'Evening near Dordrecht,' Stuttgart Museum.

Schoenn, shèn, Aloys, Austrian artist: b. Vienna 11 March 1826; d. Krumpendorf 16 Sept. 1897. He studied at the Vienna Academy under Führich and Leander Russ. He served through the Italian campaign of 1848 and fought in the Hungarian war. During 1850-1 he studied at Paris, and then traveled in the East. His field is genre. Some of his works are 'Evening on the Nile'; 'Departure of Tyrolese Students from Vienna in 1848'; 'Storming of Ladrone,' 'On the Coast of Genoa,' 'Goose Market at Cracow,' at Vienna; 'Scene in Persecution of Jews'; 'Festival in Capri'; 'Fish Market at Chioggia'; 'Market in Bosnia'; 'Market in Tunis.'

Schofield, skô'fêld, John McAllister, American military officer: b. Gerry, N. Y., 29 Sept. 1831; d. Saint Augustine, Fla., 4 March 1906. He was graduated from West Point in 1853, and assigned to garrison duty in South Carolina and Florida. In 1855-60 he was assistant professor of philosophy at West Point, and was professor of physics in Washington University, Saint Louis, Mo., in 1860-1. He acted as mustering officer for the State of Missouri at the outbreak of the Civil War, served on the staff of Gen. Lyon in the Missouri campaign and in November 1861 was appointed brigadier-general of volunteers. He was in command of the District of Missouri in 1861-2, of a division in the Army of the Cumberland in 1863, and again commanded the Department of Missouri in 1863-4. In 1864-5 he commanded the Department of the Ohio, was engaged in the Atlanta campaign and commanded at the battle of Franklin, Tenn., in 1864, receiving rank as brigadier-general and brevet major-general in the regular army in recognition of his services. He continued in the army after the war, was secretary of war in 1868-9, and commanded various departments until 1888 when he was assigned to the command of the army of the United States. In 1895 he was promoted lieutenant-general and later in the same year he was retired. He published: 'Forty-six Years in the Army' (1897).

Schoharie, N. Y., village, county-seat of Schoharie County; on Schoharie Creek, and on the Middleburg & Schoharie and the Schoharie Valley R.R.'s; about 28 miles west of Albany and 20 miles southwest of Schenectady. It is in an agricultural region, and in the vicinity are valuable stone quarries. It has a high school, graded elementary schools, and a school library.

It has one bank with a capital of \$25,000. Pop. (1910) 996.

Schoharie Grit, a more or less silicious and calcareous shale, or a silicious limestone typically found in the Schoharie Valley of eastern New York, from which it takes its name. It is intimately associated with the overlying Onondaga limestone of New York, with which together it forms the Ulsterian sub-group of the Mid-Devonic group. It is therefore the lowest Mid-Devonic formation of New York. At its type locality it is not over six feet thick and richly fossiliferous. In the Hudson Valley it is a shale, almost barren and sometimes 100 feet or more in thickness. West of its type locality the rock is not known, and outside of eastern New York it is doubtfully identified. See DEVONIAN; OLD RED SANDSTONE.

Scholasticism (Lat. *schola*, "school"). Scholasticism is the philosophy of the "schools." Charlemagne (742-814) invited leading scholars of the church to his court, established a Palatine School and a series of cloister and diocesan schools throughout his empire, and out of these as the mediæval centres of learning arose the scholastic philosophy. The term "scholastic" (Doctor Scholasticus) was applied not only to teachers of the seven liberal arts in these Carolingian institutions and the later established seats of learning, but also to teachers of theology and philosophy. The term gradually became narrowed to denote the latter class. The movement extends from 850 to 1453 A.D. and may be divided into two periods: (1) 850-1200, that is, from Johannes Scotus (or Erigena) to John of Salisbury and the Arabs; (2) 1200-1453, that is, from Alexander of Hales to the fall of Constantinople and the rise of Humanism. The first period is characterized by the controversy on the subject of universals. The second period is marked by the fusion of Aristotelianism with dogmatic theology, the delimitation of the spheres of faith and reason, and the controversy regarding the primacy of the will over the intellect. In the first period the chief figures are, Johannes Scotus, also called Erigena (that is, Irish-born, b. 810, d. 877, the earliest notable scholastic, fused Neo-Platonism with Christian theology), Gerbert (d. in 1003 as Pope Sylvester II. and distinguished for investigations in mathematics and natural science), Roscellinus (b. 1050, originator of Nominalism), Peter Lombard (d. 1164 as bishop of Paris, writer of the famous 'Sentences'), William of Champeaux (1070-1121, champion of realism against Abelard), Anselm of Canterbury (1033-1109, constructed an ontological argument for the existence of God), Abelard (1079-1142, originator of Conceptualism), John of Salisbury (1110-1180, beginnings of reactionary attitude toward the one-sided scholastic culture). To the second period belong chiefly the following: Alexander of Hales (d. 1245, one of the originators of the 'Summa,' a sort of encyclopedia of theology and natural science, that attained vogue in this period), Bonaventura (1221-74, Mystic), Albertus Magnus (Count of Bollstädt, 1193-1280, the most learned man of his age in the natural sciences), Thomas Aquinas (1225-74, fused Aristotelianism with Christian theology), Duns Scotus (1274-1308, advocate of the primacy of the will against the Determinism of the Thomists), William of Occam (1270-1347, important

Nominalist and opponent of the temporal power of the papacy). The early schoolmen possessed among other works a meagre part of the logical treatises of Aristotle, Plato's Timæus, the writings of Boethius, Cicero, Seneca, Augustine, Martianus Capella, and Pseudo-Dionysius the Areopagite. The later schoolmen possessed the whole body of Aristotelian writings, and the works of the Arabs and Jews. One of the fundamental characteristics of the scholastic period is the subservience of philosophy to theology. Philosophy is under the rigid censorship of the Church and although the intrinsic spirit of scholastic philosophy may not be that of a "handmaid to theology" (*ancilla theologiæ*), yet ecclesiastical authority reduces it practically to that position. Its real spirit is no doubt the desire to harmonize rational and revealed truth, and not to diminish the claims of reason. Nevertheless, its historical function was not so much the discovery of truth, as the defense of dogma. The service demanded of philosophy is apologetic and therefore the discipline of logic is particularly important and widely studied. Knowledge is subordinated to faith. In the scholastic era the Church was the bearer both of science and religion, but as the interests of the latter were the primary concern of the Church and in its estimation the most important for man, the subordination of science to theology was from the Church's viewpoint, both legitimate and necessary. Gradually, however, science and philosophy asserted their independent claims, and in the Renaissance, the rebirth of the Greek spirit and of the dignity and worth of profane culture,—reason assumed a distinctive position for itself. The result was a long warfare between science and theology, between reason and creed. Although scholasticism was a combination of Hellenic thought with the Church dogmas, yet the rationalistic spirit of Greek philosophy remained practically dormant during the entire scholastic period and did not really awake until the rise of Humanism. The most important question for early scholasticism was the ontological significance of logical genera or universals. In this controversy the scholastics split into two great parties, the realists and nominalists.

Realism is the doctrine that genera and species have existential reality, that is, they are entities, and extreme realists regarded such universals as existing apart from and independent of particulars. The formula for the extreme realists is that universals exist *ante rem* ("before the particular," Platonism); of the moderate realists that they exist *in re* ("in the particular," Aristotelianism). The extreme opposition was formed by the nominalists who maintained that universals or genera are only class names and have no existence apart from the name. A middle party was formed by the conceptualists or sermonists, who maintained that universals are concepts and have ideal existence as notions in the mind, or, as Abelard more specifically held, the word becomes universal by means of predication. The formula for nominalism and conceptualism is that universals exist *post rem* ("after the particular"). These discussions of the Middle Ages were powerless to advance knowledge, being mainly exercises in abstract dialectic, although carried on with great subtlety and genius in logical analysis. The

question, acquired, however, an important bearing by involving the doctrine of the Trinity and the existence of God. According to the realists the greater the universality, the greater the reality; the wider the concept the more extensive its being. God, as the most universal notion, has the most complete reality; as *ens generalissimum* He is *ens realissimum*. Further, the nominalists regarded as real only the individual, concrete thing. The realists urged against this that according to nominalism, only the three persons (as individuals) of the Trinity have reality; therefore there is no Godhead and we have Tritheism. For this consequence of nominalism Roscellinus was condemned at the Council of Soissons (1092). It was also maintained that if realism is not true, then such universal ideas as Humanity, the Church, and Original Sin refer to no real existences. Anselm, "last of the Fathers," maintained that the universals existed before particular things in the mind of God. The most memorable controversy on the subject took place in Paris between William of Champeaux and Abelard, in which the latter gained a dialectic victory. Scholasticism reached its complete formulation in Thomas of Aquino ("Angel of the Schools"). Thomas developed a system of philosophy by the fusion of Aristotelianism with Christian theology and Thomism remains to the present time the most generally accepted system of Christian philosophy in the Roman Catholic Church. Thomas sought to correlate more precisely than his predecessors the spheres of faith and reason. Reality and truth are one continuous realm, although certain truths transcend reason and are apprehended only by faith. Truths that belong to the mysteries of faith are the doctrines of original sin, the creation of the world in time, the incarnation and resurrection of Christ, the Trinity, and the final judgment. These are not demonstrable by human reason, but are matters of revelation and are assented to by faith. Faith and revelation do not contradict reason; they transcend it. Faith and reason together apprehend the continuous and harmonious reality of the supernatural and natural. It is not possible, according to Thomas, that what is true for faith may be false for reason. Yet many scholastics took refuge in the doctrine of a "twofold truth," asserting that what is true for reason may not hold good in theology. An absorbing question for the late scholastics was the psychological question whether primacy belongs to the will or to the intellect. Does the will determine our ideas, or do our ideas determine the will?—a question that was bound up by the scholastics with the will's freedom. Thomas is Determinist; Scotus is Voluntarist. Is the will or the intellect decisive for character? On the side of the primacy of the intellect (cf. the Socratic theory that virtue is knowledge) were ranged Thomas Aquinas, the mediæval Aristotelians, the German mystics, and the Dominicans; on the side of the will Duns Scotus, the Augustinians, William of Occam, and the Franciscans. On the question of universals Thomas and Scotus took similar ground, namely, that of moderate realism. Both maintained that the universals exist in the mind of God (*ante rem*) as ideas before creation, substantially and immanently in things (*in re*), and as notions and names employed by the individual mind (*post rem*). The revival of nom-

inalism in William of Occam marks the growing interest in the world of particular, concrete things, as the only real things. The renewal of nominalism was symptomatic of the condition of the age, of a growing interest in empiricism; it stood for the reform tendency, and although in the 14th and 15th centuries it grappled with realism in a final struggle and was vanquished in the Church, it found outside a powerful ally in secular science in whose triumph it shared.

The philosophy of the Arabs during the scholastic era is essentially Aristotelianism combined with elements of Neo-Platonism (the emanation theory). Their interest was mainly in medicine, natural science, and mathematics. The chief Arabic philosophers are Alfarabi (d. 950), Avicenna (980-1037), Algazel (1059-1111), and Averroës (1126-98), and they were important as the carriers of Aristotelianism and the seeds of natural science into Europe through Spain. The Jewish philosophy of the scholastic period is partly the Cabbala (a secret emanistic philosophy recorded in the works of Jezirah and Sohar) and Aristotelianism. The most important figure is that of Moses Maimonides (lived in Cordova and Cairo 1135-1204), who combined the sublunary philosophy of Aristotle with Hebrew theology.

The great and serious effort of scholasticism was to fuse philosophy and theology into a complete system free from inherent contradictions, to exhibit the harmony of natural and revealed truth, but the trend of modern thought has been to emphasize the breach between theology and science. The historical consequence has been that the original ascendancy of the former over the latter has in the long struggle yielded to the asserted dominance of science over official creed. While it was the endeavor of scholasticism to unite the dogmatic theology of the Church with philosophy, it has been the endeavor of modern philosophy to divorce them and to erect a purely rationalistic and scientific system of truth. The philosophical significance of scholasticism is apt, however, to be underestimated. It was the interpreter of questions that were vital for that age, an age in which the one question was confined to the relation between revealed and natural truth. Their fundamental problems, however, the problems of universals, of the relation of faith to reason, of mysticism, of the claims of revealed truth, are neither artificial subtleties, nor are they as yet settled.

Bibliography.—Erdmann, 'History of Philosophy (Ancient and Mediæval)' (1891); Hauréau, 'Histoire de la philosophie scolastique' (1872-80); Stöckl, 'Geschichte der Philosophie des Mittelalters' (1864-66); Werner, 'Die Scholastik des späteren Mittelalters'; Maurice, 'Mediæval Philosophy' (1870); von Eicken, 'Geschichte und System de mittelalterlichen Weltanschauung' (1887).

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Schol'ia and Scho'liast. See SCHOLIUM.

Scholium, plural **Scholia**, a marginal note or comment: specially such note or remark made upon a passage of any of the writings of the Greek or Latin classic authors by early grammarians. The writers of these scholia, the scholiasts, are mostly anonymous.

SCHOOL SUPERVISION

School Supervision. The necessity for supervision of labor grows with its subdivision and specialization. The early schools of the New England and Dutch colonists were spontaneous, and wholly what the public sentiment or the means of the localities made them. With provision for the support of schools by law came the school committee, out of which has been evolved the modern board of education. With the rapid growth of cities, due to immigration and newer organizations of industry, school systems became too complex to be managed by an unpaid committee, and the schools followed the law of business. The new function of supervision became part of the system. Its recognition in law was tardy, unequal, and sometimes reluctant, but recently the movement has become rapid and, notwithstanding many external variations, tends in the same general direction. In cities, especially, public opinion recognizes and acts upon the business principle that competent supervision of labor counts toward the maximum output of the finished product as surely as the skill of the individual workman and the intelligence of the directing board.

Supervision of schools, as observed in the United States, has developed quite unequally along three lines. As might be expected the greater advances have been made in the cities. Its advantages to scattered units of the same system, as in the rural districts of counties, are less apparent, and in many parts of the country it has been extended to them in but a half-hearted way. In many of the States, although the superintendent performs useful duties, he is only nominally a supervisor of education.

Supervision in Cities.—The city, as a unit of school organization, differs from the country district in the number and compactness of the population, and the laws are generally adapted to such special conditions. These vary greatly in detail, but have the common foundation of a board of education and a superintendent of schools. The boards vary greatly in numbers, the average being about 12 members. The tendency is to reduce the membership of the larger boards. Terms of office vary from two to seven years. Methods of selection vary. In Chicago, Baltimore, San Francisco, and Saint Paul the members are appointed by the mayor. In Saint Louis, Boston, Detroit, Minneapolis, and Indianapolis they are elected by the people. The board of education of the city of New York is composed of 10 members elected by the school boards of the boroughs of Manhattan and the Bronx, and 5 by the school board of Brooklyn; the 4 chairmen of borough school boards being *ex officio* members of the board of education. In Philadelphia, again, the board of public education is appointed by the judges of the court of common pleas. In New Orleans 8 members are appointed by the governor of the State and 12 elected by the city council. The widest departure from the foregoing types are in the cities of Cleveland, Ohio, and Buffalo, N. Y. In Cleveland a council of 7 is elected at large by the city. In the same manner is elected 1 director. The director is the chief executive on the business side, and is a salaried official (\$5,000). He also appoints the superintendent of schools, who becomes solely responsible for the instructional work, and to

that end appoints, promotes, and dismisses teachers at his discretion. This highly centralized system seems to work well. Buffalo is peculiar in that it has no school board, the management of school affairs remaining in the city council, and the superintendent of schools being elected by the people.

Similar variation is seen in the authority vested in superintendents, over details which seem to lie wholly within their natural province. For example, in the matter of the selection of text-books, of 229 cities the superintendents in 92 have full authority, in 44 joint authority, in 85 advisory, and in 8 none at all.

Amid all this diversity, what signs of movement in a common direction toward a common purpose appear? Several are to be noted. There seems to be a growing determination to separate the affairs of the schools from other municipal business by the appointment of boards of increasingly good quality, whether the appointing power is vested in the mayors, etc., or retained by the voters. There is a growing tendency to define the powers to be exercised by the board and the superintendent, the board retaining control of expenditures and the general school policy, and vesting the organization and sole direction of the instructional forces in the superintendent. On the business side, perhaps, this division is less clear. Cleveland remains the single example of a clear line of demarcation between executive and legislative functions and the separation of the former into two distinct and well-defined departments. Again, while it is conceded that the final authority in school affairs should be the board of education, it is coming to be seen that the superintendent should have wide discretion and a tenure of office during good behavior and efficiency; that some of his duties may well be defined by the statute law; that he should have large, if not complete, power of appointment and dismissal, but that teachers once permanently appointed should have like tenure as his own; that he should have a seat and voice but no vote in the board of education. Having power to determine all matters relating to instruction, he should be held responsible for the professional spirit and quality of the teaching, and when he does not maintain it, after a reasonable trial, he should be superseded.

County and District Supervision.—In practically all the States, except those in New England, there are county superintendents of schools who are especially charged with the supervision of the isolated, "ungraded," one-room schools in the country districts. The method of selecting this class of supervisors varies in different States. To illustrate: In Pennsylvania they are chosen *viva voce* by a majority of the school directors, and are removable by the State superintendent. In Georgia they are appointed by the county board of education, which, in turn, has been appointed by the grand jury of the county. In Indiana they are elected by the trustees of townships and school trustees, and become *ex officio* presidents, and have votes in the county boards of education composed of the said trustees. In New York they are chosen in districts containing possibly 100 school districts, and are called commissioners. In Wisconsin a county superintendent is elected, but counties having a population greater than 15,000 may be divided into two districts, the county

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superintendent elected being assigned to one district by the county board and the State superintendent empowered to appoint a district superintendent for the other. In New Jersey, Mississippi, and Virginia the office is filled by the State board of education. In Alabama the superintendent of public instruction, and in Delaware and Florida the governor, appoints the county superintendent, while in North Carolina the county board of education, assisted by the clerk of the supreme court and the registrar of deeds, exercise the appointing power. In most other States the office is elective. The most common term of office is two years. In New York and Pennsylvania it is three, and in Illinois and Wisconsin four years. The compensation is uniformly low, being usually \$3.00 or \$4.00 per diem. In Illinois it has lately been fixed at \$1,250 per annum in counties of the first class, \$1,650 in counties of the second class, and \$7,500 in counties of the third class. It should be noted, however, that there is but one county of the third class. The compensation of county superintendents is usually paid, at least in part, by the State out of the school fund.

Efficient supervision of the widely separated small schools is not less important, but much more difficult than the supervision of the more compact groups in the cities of moderate size, and even approaches in difficulty the superintendence of the great aggregations in large cities. This statement may not appear obvious at first thought. A concrete illustration may help to clarify it. In one of the North Central States there is a county whose population by the last federal census was 67,058, in which is a city of 36,252 inhabitants. The city has a superintendent of schools who supervises the work of 114 teachers in 12 buildings, some of them as good as the best to be found anywhere, none poor, and all well furnished. There is a principal in each building, a special supervisor of music, physical culture, and manual training. The city superintendent has a clerk on full time. The county superintendent, who is, by law, the supervisor of all the schools in the county, including the 12 city schools referred to, has also under his direct supervision 156 one-room schools, scattered through 25 townships, covering an area of about 800 square miles. He is required by law to visit each of them at least once a year. His allowance for clerical assistance for the year for which this comparison is made was \$106.06. The difference in compensation was \$500 in favor of the city superintendent. In the practical work of supervision the city superintendent can call his 12 principals together any day. He can see all or any group of the 114 teachers. He can take a street car and be at any school room door within a half hour. At certain hours of the day any parent in the city may find him in his office. He can set up his standards of excellence and know the various approximations to them by his teachers. He can transfer pupils and teachers in the interest of greater efficiency. He can supervise his schools. On the other hand, the county superintendent, after examining 252 applicants for teachers' certificates, conducting his institute, examining the books and accounts of 25 township treasurers, and performing other duties enjoined by law, finds he has remaining just 134 school days in which to traverse 800 square miles and inspect his 156 ungraded schools.

The supervision of the county superintendent must in the nature of the case be less efficient than that of his fellow superintendent in the city schools. But it should have been more efficient, inasmuch as it was much more necessary. The longer terms in the city, the division of labor, the better facilities for work, the decidedly better pay, all the stimulating influence of comparison, example, criticism, correction, co-operation, combine to attract the better teachers to the city schools. This increases the need of oversight and direction in the country. These contrasted conditions are typical. In greater or less degree they exist in nearly every county in every State. They illustrate the difficulties of county supervision, and account for the fact that most county superintendents are quite ready to accept an appointment in the city when it is offered. No estimate of the value of supervision in the country can disregard them. It cannot be said that supervision has affected the ungraded schools to the same extent that supervision has affected the city schools. But it undoubtedly has been of very great value. That in very many localities the people see this is plainly evident in the increasing care they take in the selection of county superintendents. In the prevailing absence of statutory requirements of professional qualifications for candidates, it is dangerous for either party in the States where they are elected by popular vote to present a candidate who is known or believed to be deficient. While this mode of selection prevails, and other differences are as great, it is too much to expect equal efficiency. These differences in efficiency, however, are likely to be much less obvious in the near future. The improved country roads, the country trolley roads, the free mail delivery, and other ameliorations of country life are operating to stimulate the demand for better schools in the country. The small district system, confessedly the worst adapted unit of organization conceivable, if the schools are to have any of the advantages of organization and intelligent direction, has outlived its usefulness, and the day of consolidated country districts is at hand. The feasibility of transporting children to and from school has been demonstrated under different conditions in New England notably in Massachusetts, and in Ohio and Indiana. Other States are following or getting ready to follow the lead of these. The consolidation of the country schools, township, or a larger district, organization means somewhat fewer teachers, country school principals, better classification, better teaching, and immensely better and more effective supervision. When it is recalled that about one half of the nearly 16,000,000 children in the elementary schools in 1902 were in country schools, it will be seen that the importance of this phase of school supervision hardly can be overstated. The almost insuperable obstacle in county or district supervision is to find qualified men who are willing to assume duties as arduous as they are difficult for the inadequate pay and, oftener than otherwise, with a precarious tenure. The ultimate solution may be found in some extension of the principle of State aid, coupled with a smaller unit than the county.

State Supervision.—The State is the supreme authority for the school system. Each State has its school code, enacted, generally, in obedience to a constitutional injunction "to es-

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establish and maintain a thorough and efficient system of free schools whereby all children may obtain a good common school education," or words to like effect. The State, however, never incorporates actual supervisory powers over the work of instruction. It rarely extends its direct supervisory power as far as actual inspection by its own direct agents. So far, the States have been content to give more or less administrative power to a single official, with rather meagre facilities for effective work beyond making and keeping a statistical record of educational progress, coupled sometimes, with certain quasi-judicial functions and, usually, with unlimited advisory powers and duties.

In a few States there are boards of education with varying powers and duties. The board of regents of the State of New York, first appointed in 1784, was originally little more than an advisory board for Columbia College, but its powers have gradually been increased until it may fairly be regarded as a model in its way. It is now composed of 11 members, one elected annually by the legislature for a term of 11 years. As early as 1825 an educational board, composed of the chief justice, the speakers of both branches of the legislature, and the State treasurer, was established in North Carolina under the title of "President and Directors of the Literary Fund." The State board of education of Massachusetts dates from 1837. It consists of eight members, one appointed annually by the governor for a term of eight years, the governor and lieutenant governor being members *ex officio*. The State board of Connecticut, established one year later, is organized on a similar plan.

The so-called State board of education in Illinois is composed of 14 members, appointed by the governor for a term of 6 years, the superintendent of public instruction being a member and secretary *ex officio*. The functions of this board are limited to the management of one of the State normal schools.

There are boards of education in 26 other States, in 10 of which the superintendent of public instruction is president and in the others secretary. The duties of most of these boards pertain almost entirely to the examination and certification of teachers. When composed of *ex officio* members a board of education has little directive or stimulative effect upon the schools. When the membership is selected with reference to the duties to be performed, as in New York, Massachusetts, and Connecticut, these boards exercise great influence upon the supervision.

In each State there is a nominal head of the school system. The titles vary almost as much as the systems. In 29 States it is "Superintendent of Public Instruction"; in Maine, Missouri, and Wisconsin it is "Superintendent of Public Schools"; in Louisiana and Mississippi, of "Public Education"; and in Alabama, South Carolina, and Vermont, of "Education"; and in West Virginia it is "Superintendent of Free Schools." In New York the title is "Commissioner of Education"; in Georgia, "State School Commissioner"; in Ohio, "State Commissioner of Common Schools"; and in Rhode Island it is "Commissioner of Public Schools." In three States, Massachusetts, Connecticut, and Delaware, the title is "Secretary of the State Board of Education."

The mode of selection varies almost as much as the official title, the office being filled by popular vote in 31 States, by election by the board of education or regents in 4, by the General Assembly in 3, and by executive appointment in 7 States.

There is like variation in powers and duties of State superintendents. New York presents the best example of a highly organized educational system, with a responsible head, having authority under the law and ample working facilities to translate the authority into continuous influence upon every part of the system. In the State of New York the commissioner of education is appointed by the board of regents to serve during their pleasure, and is their executive officer in matters relating to colleges, universities, professional and technical schools, libraries, museums, university extension courses, and similar agencies. The entire supervision of elementary and secondary schools is devolved upon him. He is authorized to establish such departments as shall be necessary, and accordingly has an assistant commissioner in charge of elementary, secondary, and higher education, respectively. These in turn appoint such subordinates in their respective departments as in their judgment shall be necessary. All appropriations of public money in support of elementary or secondary education are administered by him. He may certificate teachers upon examination, or, if graduates of colleges or university, who have had three years' experience, at discretion. He may endorse a diploma issued by a State normal school or a certificate issued by the authorities of another State thereby validating the same in New York. He may annul teachers' certificates for cause, and remove school commissioners from office for neglect of duty, and may withhold any share of the public money from any district wilfully disobeying any decision, order, or regulation of the commissioner. He may appoint teachers' institutes in the commissioners' districts and employ suitable persons to supervise and conduct them, establishing such regulations for their government as he may deem best. He may hear and determine appeals from school district meetings, school commissioners, and other officers, and his decision is final and conclusive and not subject to question or review in any place or court whatsoever. In other words, he has the widest discretion and a continuity in place that justifies its exercise in the prosecution of plans covering a considerable period of time.

In somewhat striking contrast to this highly centralized system is that of Massachusetts. So entirely has that State adhered to the theory that the people should carry on their own local institutions that the secretary of the State board of education, in his latest published report, declares that "Massachusetts has no State system of education, nor any approach to one," and that in this respect "it is unique among the States." But, as he well adds, "To say that Massachusetts has no State system of education is not equivalent to saying that it has no educational policy." And in the administration of its policy that State has shown how the spirit of wise supervision, with all the elements of oversight, encouragement, assistance, direction, and even compulsion may operate in the absence of an elaborate school code. School terms have been lengthened; the State requires that an oppo-

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tunity for high school instruction shall be open to all who are prepared to profit by it; it requires the towns to form unions for the employment of superintendents of schools, and pays half the salary of these officers, solving one of the difficult problems of county supervision by limiting the number of schools under one supervisor; while it does not certificate teachers, it does "approve" superintendents, upon examination, and in the State normal schools offers special courses of study for superintendents of schools; it has shown how to retain in the country schools the old-fashioned stimulus of a number of pupils large enough to constitute a school, and that, too, without material increase of cost, by "consolidation." All this and much more which has contributed to give Massachusetts the power to say that "her citizens get nearly twice the national average amount of education," would appear to be the result of the essence if not the form of State supervision. The board of education, with its statutory power limited to the collection and distribution of information, has through its secretaries and agents, while conserving the tradition of local responsibility, contrived clearly and concretely to set before the people the best ways of doing the things most desirable to be done. This work has been effective, perhaps, chiefly because of its continuity. In nearly 70 years there have been but 7 secretaries of the board of education. Hardly less credit is due to the "agents." They are invariably practical school men. Through them the board may know every weakness and excellence of every school district, committee, or teacher, and the board may in turn make them the messengers of its counsel, warning, or encouragement.

A careful study of these two extreme types of school supervision by the State, whether the bias is in favor of the Massachusetts policy of information, advice, and assistance, or the New York system of well-defined authority and direction, will lead to the conclusion that the prevailing absence of actual inspection of existing school conditions is the most serious handicap to efficient supervision. This drawback extends also, in many instances, to county and even city supervision. See EDUCATION, THE DEVELOPMENT OF THE OFFICE OF SCHOOL SUPERINTENDENT.

ALFRED BAYLISS,

Superintendent of Public Instruction, State of Illinois.

School System, American. Distinguishing Features.—The educational system of the United States is often characterized as "unique." Perhaps it may be distinguished from the systems of other countries in the following particulars:

1. It was not initiated by the government or by any central power. Schools were started wherever there was a settlement. Farmers united in the support of a school at the cross-roads. As cities grew, the grading system was commenced. Accordingly, the school system has always been exceedingly flexible and adaptable to local conditions.

2. The system has not been managed by central authority. It has been and is administered through primary assemblages of citizens, wherever practicable, and by officers chosen at popular elections, when meetings of all interested citizens became impracticable. In the larger cities the schools are managed by boards of edu-

cation, elected by the people or appointed by officers so elected. The management of the schools has never been given over to a minister of education, but invariably kept in the hands of the people.

3. Originally, schooling was held to be a private or parental matter. The state was to give moral encouragement only, at first, and later some financial aid, to the schools. But as it came to be seen that the safety of the state, with universal suffrage, depended upon the schools, the law-making power began to exert control in the matter to the extent of assuring a suitable school to every home, and by exercising the taxing power, directly and through delegating it to local corporations, so as to subject all property to the educational expenses and making the schools free.

4. The use of the taxing power by the state logically made it necessary for the state to oversee the expenditures of money, and this enlarged the centralized influence over the educational system. As schools multiplied and grew in size this enlarged state influence became necessary and welcome. It tended to consolidate the system and make the work more uniform. The result is system and uniformity, happily balanced with local self-management and adaptability to the immediate conditions.

5. Out of this has grown a system of local expert supervision through superintendents of schools—a system which is indigenous and exclusive to America.

6. The public educational scheme has extended beyond the free primary school in reach of every home, and now includes free secondary schools or high schools in every considerable town, and a free college or university in nearly every State.

7. The schools of different grades, from the primary to the university, work together with considerable exactness. The course is practically continuous and pupils are fitted by each school for the school above and encouraged to go to the top of the educational system. There are no class distinctions.

8. The schools, in law and in popular thought, have no flavor of charity. They are the inalienable right of all, an integral part of the governmental plan. They are not a boon of the government to the people, but they are the people's own, for their own and the nation's upbuilding.

9. The educational scheme leaves every community free to elaborate its school plans according to its own intelligence and means. It also encourages all manner of private educational undertakings. Every effort for enlightenment or culture, whether in an organized school or not, is sustained and finds a welcome place in the educational system of the country.

10. The public, or "common," school system is free from all partisanship or sectarianism. The state encourages parties and sects, but it will not enter into financial relations with them nor divide its responsibilities with them.

11. Girls have equal educational rights with boys in America. The sexes are almost invariably trained together in the primary and secondary schools and in all of the higher institutions supported by the state.

A. S. DRAPER,

Commissioner of Education, State of New York.

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School System, Public. See PUBLIC, OR COMMON SCHOOLS.

Schoolcraft, skool'kräft, Henry Rowe, American ethnologist and author: b. Watervliet, Albany County, N. Y., 28 March 1793; d. Washington, D. C., 10 Dec. 1864. He was educated at Middlebury and Union colleges, in 1820 was made geologist to an exploring expedition under General Lewis Cass to the Lake Superior copper region and the upper Mississippi, and in 1822 became Indian agent for the northwestern frontier, with headquarters at first at Sault Sainte Marie and later at Michilimackinac (or Mackinac). From 1828 to 1832 he was a member of the Michigan territorial legislature. He commanded in 1832 the expedition which discovered the sources of the Mississippi, and in 1836 concluded with the Indians about the Lakes a treaty by which cession of 16,000,000 acres of land was made to the United States. Soon afterward he received the appointment of acting superintendent of Indian affairs and disbursing agent for the northern department. In 1847 he began the preparation, under government appointment, of his elaborate work, 'History and Statistical Information Respecting the History, Condition, and Prospects of the Indian Tribes of the United States' (1851-7). For the first five volumes an appropriation of nearly \$30,000 per volume was made by Congress; the sixth and last was published at the expense of the War Department. The work was finely printed, and illustrated by 336 plates. It was the first means of introducing Indian legend and tradition to the general reader, and gained a considerable reputation as a work of scholarship. Parkman, however, whose opinion is of very high value, considers that the work was quite inadequately done, particularly in view of the unusual facilities placed at the author's disposal. Among Schoolcraft's other volumes are: 'Algonic Researches' (1839); 'Oneota; or Characteristics of the Red Race of America' (1844); 'Personal Memoirs of a Residence of 30 Years with the Indian Tribes' (1851); and 'Scenes and Adventures in the Semi-Alpine Regions of the Ozark Mountains' (1853).

Schools, County Training. The County Training School is a school organized for the purpose of giving professional training to teachers preparing for work in the rural schools. The lack of properly trained teachers has been one of the sources of the weakness of these schools. The number of normal schools in the country is not sufficient to furnish trained teachers in adequate numbers for the rural schools. The increasing demand for teachers with special training which has come from the graded schools and high schools in the cities and villages has absorbed practically the entire output of the normal schools. The teachers in the rural schools have been drawn largely from the high schools and from the country schools themselves. Practically the only opportunities for any special preparation on the part of the majority of these teachers have been those afforded by the teachers' institutes, and occasional vacation schools which are held with more or less regularity in many States, but which are usually of short duration and totally inadequate for the proper preparation of teachers. The problem of securing better prepared teachers in the rural

schools is one which has attracted the attention of leading educators throughout the country for many years.

The "Committee of Twelve" of the National Educational Association, appointed in the year 1895 to investigate and report to that body on the conditions of the rural schools and means of improving those conditions, after two years spent in investigation, presented the most elaborate and complete report upon that subject ever made in this country. On the subject of facilities for the preparation of rural school teachers, among other things, that committee described two classes of summer schools: one conducted for the purpose of enabling those in attendance to pass the teachers' examination for certificates; the other conducted by specialists, masters in their field, for the purpose of extending education along true lines; and this committee recommended a third class of schools as necessary for the better preparation of country school teachers. The following is the language of the committee: "A third class, with professional courses in psychology, pedagogy, and methods, often combining the character of the second class preceding, offers great advantages for professional improvement. There should be in every county one of these for the especial benefit of teachers of the common schools; they should be free of tuition, organized and conducted under the supervision of the State department of education, continuing from 4 to 10 weeks. There should be provision for practice teaching, and the instructors should be familiar with rural schools, their condition and needs."

In another part of the report of that committee occurs the following: "(1) A large proportion of the teachers of rural schools cannot afford the time and expense of a two-years' course in a normal school. (2) The receipts from employment in the rural school under present conditions do not remunerate one for the expense of a normal school course. This is a simple matter of business, and sentiment will not change the facts. (3) Other conditions remaining the same, attendance at a school is in an inverse ratio to the distance between school and home. This is especially true for a short course. To meet these conditions there is needed a normal training school with a short course of study. The place—a village which will give over its schools to this normal training school for practice schools. These practice schools, organized as primary schools in one room and as grammar schools in another, will show what can be done with schools in the simplest form of gradation. For a part of the course all the grades should be brought together to illustrate the work of the one-teacher school, such work as should be done in the ungraded school."

The conditions and demands thus set forth by the report of the Committee of Twelve were recognized by educational men as existing. The county training school has come into existence to meet these demands. The first schools of this kind in the United States were established in Wisconsin, in 1899.

Wisconsin Plan.—The County Training Schools were established under a State law authorizing county boards to appropriate money for the establishment and maintenance of this class of schools and providing for State aid to

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such schools to the amount of one half of the sum expended yearly for maintenance, but limiting the sum to be paid annually by the State to any one school to \$2,500. The local management of each school is vested in a board of three members. Of this board the county superintendent of schools is ex-officio a member and secretary; the other two members are elected by the county board of supervisors. The State Superintendent of Public Instruction has general supervision of these schools, prescribes the courses of study to be pursued, and determines the qualifications of the teachers employed in the schools. The schools must be maintained 10 months each year and the scope and character of their work must be such as to meet the approval of the State Superintendent, in order to receive State aid. The certificate of graduation from the prescribed courses becomes a legal certificate of the third grade, good for three years within the territory comprising the training school district. Two or more counties may unite in establishing such a training school. Students may be admitted to the training school from any county outside a training school district, and the county board of such county is authorized to provide by tax upon the property of the county for the payment of the tuition of bona fide students of the county who may attend such school. Tuition is free to all students living within the training school district.

Administration.—Under the provisions of the law a one-year course has been prescribed covering the subjects ordinarily taught in the rural schools and including instruction in the elements of agriculture, school management, pedagogy, the elements of psychology, and observation of teaching and practice teaching in the public schools of the community in which the training school is located. In some of the schools instruction is given in manual training and domestic economy. At the outset students were admitted to the schools without examination upon the presentation of the diploma of graduation from the district schools, but year by year the standard has been raised as the schools have continued their work, though it varies somewhat according to the educational conditions in different counties. The State Superintendent, in fixing the qualifications of teachers, requires that to be eligible to teach in these schools, a person must hold a State certificate and therefore must have had experience in teaching. While emphasis is placed upon securing a reasonable mastery of the subjects taught, the teachers in charge of these schools aim to carry on their work of instruction in such a manner as to keep the professional idea constantly before the students. In other words, these teachers recognize that they are not only to teach the academic subjects in the course of study, but they are to teach their students how to teach these subjects in the schools in which they will be employed later. It will thus be seen that the county training school is practically what the "Committee of Twelve" called for in plan of organization, but with a course from 4 to 10 times as long as suggested by the committee. It is a first-class normal school with a one-year course of study specially arranged to meet the needs of the rural school teachers. Extended scholarship cannot be secured, and no attempt is made to secure it, but the aim is to secure

a definite knowledge of the common school branches, with such instruction as to methods of teaching, and such observation of good teaching and practice in teaching as may be offered during the one-year course.

Advantages.—The advantages of these schools are that they are local schools. Being established and supported in part by the county, they are a matter of local pride; the people are interested in them and in their product. Young people living in the county who wish to prepare themselves for teaching in the rural schools, find it possible to take a one year's course in the training school at far less expense than would be incurred in attending a State normal school at a considerable distance from their homes. While no pledges are exacted from students that they shall teach in the county, practically all the graduates do so teach.

In the counties where such schools have been organized, the teachers in charge keep in touch with their students after graduation when they have begun their work of teaching. The close relations existing between the county superintendent and the training school teachers make it possible for the latter to inspect the work of these graduates in their schools. In this way any weakness on the part of the graduates of the school is discovered by their former teachers and practical assistance is rendered them in overcoming it. This visitation also enables training school teachers to revise their own work at points where weakness has been shown and thus strengthen it year by year. The relations between the graduates of the school and their former teachers are such that through correspondence much valuable assistance is rendered the graduates in the way of suggestion and advice as to modes of overcoming difficulties which they meet in the administration of their schools. The teachers in the training schools, through their inspection of the rural schools, become acquainted with the patrons of the schools and members of district boards, and are able to render valuable assistance to the county superintendent in conducting local teachers' meetings and by giving educational addresses in different parts of the county, and thus help to raise the educational standard of the entire county.

Experience thus far shows that practically all the graduates from the county training schools enter upon the work of teaching and for a number of years render valuable service to the schools of the county. They begin their work of teaching with a full year's special training under excellent teachers, whereas without the opportunity for training which the county school offers, a large percentage of them would be teaching without such preparation. They can afford to attend a local school for one year and then teach at the salaries paid in the rural schools, when they could not afford to spend four years in a State normal school and then teach for such salaries, even though their services were not in demand in the graded and high schools. The county training school furnishes a body of teachers not with the highest grade of preparation, but with a far better preparation than exists without such schools. A large number of students attend these schools because they are near their homes and the expenses are small, and because once established, district boards see the advantages of employing graduates of such



STUDENTS OF THE DUNN COUNTY TRAINING SCHOOL AT WORK IN THE MANUAL TRAINING ROOM

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schools rather than those who have had no special training. Had these schools not been in existence a large percentage of these students would never have attended any higher grade of school than the rural school, whereas after having had a taste of the professional training given in the county training school, and after two or three years' experience in teaching, many of them go on to higher schools and take an advanced course of instruction.

In 1903 seven such schools were in operation in Wisconsin. Their success has been so unqualified that the county training school may be regarded as a permanent part of the educational system of the State and its extension to other counties will unquestionably be authorized by the legislature as the demand for it becomes evident. The success of the county training school, as of any other school, given a rational system of organization, is dependent upon the quality of the teaching force employed. Wisconsin has been especially fortunate in this respect. At the outset in the organization of these schools, county boards were led to see the importance of employing only the best teachers obtainable and advised not to attempt the organization of the school until they were ready to pay salaries which would secure such teachers. As a result salaries in the training schools compare favorably with the salaries paid in the best high schools in the State. Seven of the schools in Wisconsin employ two teachers each; one employs three. The number of students in attendance ranges from 40 to 70, with an average of about 50. The experience in that State indicates that in the very near future, in the counties having these schools, no teachers will be employed in the rural schools who have not had special training for the work of teaching.

New York State has had a system of training schools in connection with its city schools, and, in 1903, Michigan organized a number of county training classes, but on a very different plan from that in Wisconsin.

L. D. HARVEY,

Superintendent of Schools, Menominee, Wis.

Schools of Dramatic Art. The earliest educational institutions for the arts of acting and the drama were organized in Italy in the 14th century. These were not strictly or exclusively Schools of Dramatic Art. They were Schools of Music in which dramatic study occupied a small, but in progress of time, a larger and larger function. The first institution of this kind, a school of music which included dramatic art in its course of study, was founded in Naples by the Italian Government in 1350. This school was for the operatic stage,—for poor young men and boys, to whom tuition was furnished without fees. Its most famous graduates were composers and teachers of music. Neither this nor in their chronological order, the next three institutions of like nature which were created in Spain in the 16th century, exist to-day. The workmanship in these schools was very primitive. In Naples, the educational centre, musically and dramatically of that time, there had been prior to 1818, four such schools for male pupils only. In that year, 12 months after the French invasion of Napoleon I., all the existing schools of this character were concentrated into one, the

"Real Collegio di Musica." In Vienna, there were four similar schools (for female pupils), which, after a short period, disappeared with the republic. In Naples, in 1537, Giovanni di Tappia founded a School or Conservatory of Music, including in a limited sense, dramatic courses of study which approximated more closely to the idea of the modern School of Acting. This was named the "Santo Maria di Loreto."

These early Schools of Music were usually called Conservatories, from the Latin, *conservatorium*, a place where things are preserved, a repository. They were, as the name implied, store houses of traditions. The Italian "Conservatorio" was, originally, a "house for orphans and foundlings." The schools themselves grew out of musical instruction given in houses and hospitals, and were attached to benevolent institutions and hospitals, or founded by rich private individuals. The two largest schools in which elocution and dramatic art, especially in preparation for opera, were taught, were the one, in Florence, supported by the government, and the other in Milan, established by a very old society. This latter institution in Milan, founded in 1808, is to-day one of the leading conservatories of music and dramatic art in the world. A very early and unsuccessful attempt had also been made in Paris in 1637 to found a dramatic school.

One of the first, if not the very first, important establishment, solely for dramatic training, was that of "The Children of the Revels." This was a training school for young actors in the middle of the 17th century, spoken of by Pepys in his famous 'Diary.' It is also referred to by Dryden in the poem 'McFlecknoe,' in the lines:

Near these [i. e., certain houses] a nursery erects its head,
Where queens are formed and future heroes bred;
Where unfledged actors learn to laugh and cry,
And little Maximins the Gods defy.

Recruited by this famous School of Dramatic Art, the new theatres of that time are said to have prospered exceedingly. The story of the birth of this school is told in a pamphlet published by the Shakesperean Society in 1842. It was in 1665 that on a petition of Thomas Killigrew and Sir William Davenant, a patent was granted by the government to William Legg, one of the grooms of the bedchamber, whereby he was vested with "power, liberty, license and authority to erect and make a theatre and to gather together boyes and girles and others to be instructed, in the nature of a nursery, for the training upp of persons to act playes, to bee from time to time approved by the said Killigrew and Sir William Davenant, that they may out of the said company take out actors and remove the said boyes and girles and other actors soe to bee instructed, for the supply of each of their said companyes as shall bee meete." This school did not survive its founders. Aaron Hill, a writer and playwright of distinction, in 1733, elaborately designed a "Thespian Academy," founded on the plan of a commonwealth of the players themselves. This, however, like the majority of modern efforts to organize a dramatic school, had a short and insignificant life. It is remarkable that while so early in the field England has been unable to sustain a permanent institution of this kind, excepting colleges

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of music with subordinated departments of dramatic art and elocution. A number of the latter have in recent years sustained themselves satisfactorily, as in the case of the "Royal College of Music," in London, incorporated in 1832, and the South Kensington Training School of Music, founded in 1876.

The next most significant movement in dramatic education took place in France. This was the most famous, successful and permanent of schools of dramatic art in the world's history, the "Conservatoire" of Paris. In 1734, Baron de Bretruil founded in Paris the "Ecole des Chants," at first for operatic training. In 1784 this became an "Ecole Royale de Chant et de Declamation." Suspended during the Revolution, it became by a decree in November, 1793, an "Institut Nationale de Musique." In August, 1795 (16th Thermidor, Anno III), it obtained a final organization and the name "Conservatoire Royal de Musique et de Declamation." The classes in "Declamation" (Dramatic Art) were instituted 3 March 1806, with the great actor, Talma, as one of the professors. Nearly all the great actors and actresses of France of the past century have been graduates of the Conservatoire. The majority of the actors of Europe who are not or were not from this great academy came from other dramatic schools that followed the example of the Paris organization, notably and nearly contemporary with the Paris Conservatoire, in Copenhagen, Warsaw and Saint Petersburg. Other dramatic schools following closely the Conservatoire model were established in Prague in 1810, Brussels in 1833 and Vienna in 1816.

It was not until the middle of the 19th century that the great development in Germany of the national and private Theater-Schulen (Theatre Schools) began. To-day every leading theatre in Germany has its associated School of Dramatic Art. These German schools lay much stress upon declamation and literature and less upon action and pantomime, as consistent with the national temperament.

A very interesting, and during the life of its founder, extremely successful movement in Dramatic Education was in Paris, about 1840, in which young boys and girls were taught, not only as actors, but to perform every duty before and behind the scenes. The pupils themselves executed every function of their own little theatre.

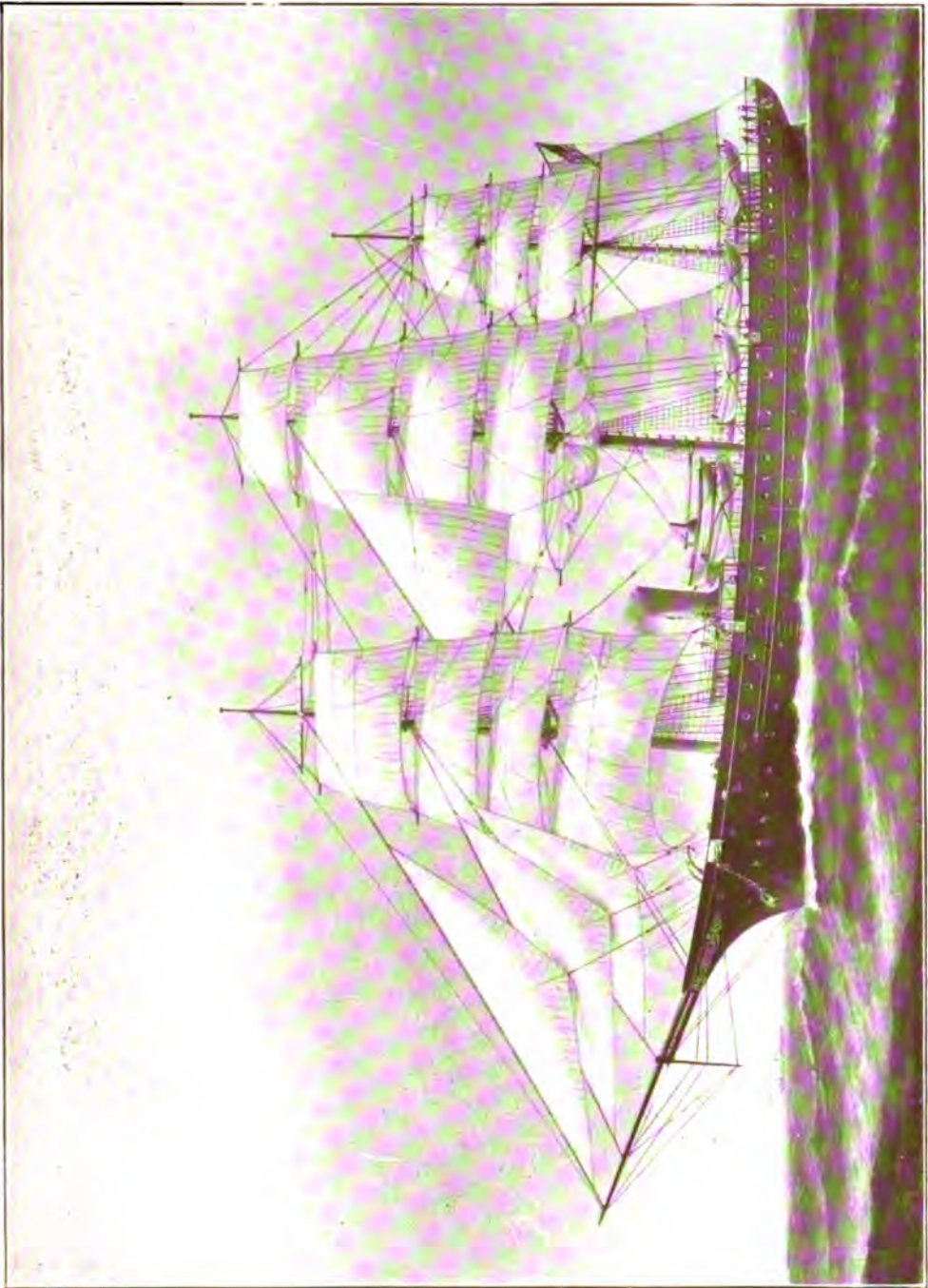
The influence of the Paris Conservatoire has been so much greater than that of any other dramatic school that a brief outline of the plan of action of its dramatic department seems valuable. Applicants are examined and are refused or are admitted to the classes either as active members or as listeners (taking no part). No fees are charged. There are five professors, all graduates of the Conservatoire and associate actors of the Theatre Française. There is one instructor in deportment, a lecturer on literature and occasionally an instructor in fencing. The classes number about 50 members each and meet two times per week for two hours each time. Each professor has separate charge of a given class. The instruction is based entirely upon the actor-teachers' practical illustration and individual judgment. The scenes chosen for study are from the standard French drama. A performance of short scenes from

plays is given by the students at the end of the two years' course of study, before an examining committee of the most distinguished men of letters and art of Paris. A first prize opens the stage-door of the Théâtre Français, a second, of the Odéon. An "accessit" carries with it recommendation to the stages of the other theatres in Paris. Preservation of the traditions of the French stage and perfection in speaking the French language are first considerations in the curriculum.

The comparative failure of all attempts to establish dramatic schools during the latter half of the 19th century may be ascribed to the fact that the great fame of the Paris Conservatoire established a fixed standard over a century ago and one which could not be entirely suitable to present times or to other nations than the French. Then again the success of the Conservatoire has been largely due to the great personal powers of its leading professors, of whom in this century Regnier has been the greatest, and Got and Delaunay the next in distinction. Educational science and the art of the theatre have progressed greatly since the time of the decree of Moscow, when Bonaparte framed the rules and plans of the Paris Conservatoire.

To some extent the United States with its newer civilization, has shown considerable advance in the solution of the educational problems of the theatre. James Fennell, an English actor, who came to America at the close of the 18th century, was the pioneer of dramatic teachers in the United States. Mr. Fennell's chief disciple in teaching was Lemuel G. White of Philadelphia. The best known actor, according to Fennell's methods, was Edwin Forrest. This Forrest school or method, as it was known, sought for natural processes of art-study and avoided technicalities. Then came, about 1827, with the theories of James Rush, M.D., the so-called technical school, of which the best known representative teachers and actors were George Vanderhoff, James E. Murdoch and Joseph E. Frobisher. The last named founded in 1872 in New York, the first American institution in which dramatic art was the special, though not the exclusive feature. The Frobisher College of Oratory, however, did not survive its originator.

In the last quarter of the 19th century there was great interest in all branches of dramatic art, especially in physical expression, elocution and stage business (stage movement and picturing). The decadence of the local or stock companies which furnished much incidental training to the young actor, the diminished number of such companies, created a demand for preparatory instruction in the art of acting. Lewis B. Munroe was the pioneer in his Boston University School of Oratory in 1873 of a school which gradually became known as the Delsarte method. But Munroe taught readers and teachers rather than actors. Nearly all of the many schools of elocution or expression (so called) in America, have been made and directed by Munroe's pupils. In all these elocutionary schools, dramatic art is taught as a subsidiary subject. The theory and methods of François Delsarte were brought from Paris to America by James Steele Mackaye, Delsarte's principal pupil. A great change in processes and in the rationale in the teaching of elocution and dramatic and phys-



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ical expression was the immediate result, and the study of these branches acquired new life and meaning. The Delsartean cult sought a deeper, newer, and more inspirational philosophy somewhat parallel with the psychologic advance in general education. The doctrines of Delsarte doubtless were often misused, exaggerated or twisted out of their original meaning and character.

Dramatic education in America began its era of greatest activity in 1884. In that year the first institution, devoted exclusively to stage training and dramatic art was founded in connection with the Lyceum Theatre of New York. This was originally known as the Lyceum Theatre-School, popularly called the Lyceum School of Acting. Its founder was Franklin H. Sargent, who during the first year, 1884-5, associated Steele Mackaye and Gustave Frohman in the management.

A few years later the name American Academy of Dramatic Arts was adopted. In 1897 the Empire Theatre Dramatic School (which had been founded in 1895 by Nelson Wheatcroft) was placed under the direction of the Academy management, by arrangement with Charles Frohman. In 1899 the Academy was incorporated and received a charter from the Regents of the University of the State of New York, the first governmental recognition ever accorded in America to a School of Dramatic Art. The first trustees of the Academy were Franklin H. Sargent, president; Ernest P. Stephenson, vice-president; Benjamin F. Roeder, secretary and treasurer; Daniel Frohman and Charles Henry Phelps. Instruction in this Academy has been furnished to about 200 pupils yearly, nearly all of whom go upon the professional stage. In quick succession other schools have appeared, mostly since 1884, which gave more or less professed instruction in dramatic art. The most important of these are The Emerson School of Oratory, Boston, Mass., The Boston or Curry School of Expression, the Philadelphia School of Elocution, the Cummock College of Oratory, Evanston Ill., the Chicago College of Music, the Detroit School of Expression, the Minneapolis College of Music, Oratory and Dramatic Art, and the Stanhope-Wheatcroft Dramatic School. A few of the higher institutions of learning, particularly in the Middle States, have schools of oratory and dramatic art,—notably, the Illinois Wesleyan University, Northwestern University, Ohio Wesleyan University, University of Michigan, Chicago University, and in Washington University in Saint Louis where the first chair of Dramatic Art in an American college was established in 1902.

In the schools of elocution the highest yearly average of professional actor graduates is only about 3 per cent. The term School of Dramatic Art or School of Acting has been much depreciated by the assumption of the title by individual teachers of private pupils and private classes. The real dignity and authority of these existing American schools of dramatic art, which may be worthy of permanency, is due largely to the fact that their directors strive to keep abreast with the newer ideals and more perfect forms of the higher education, combining the forces and feeling of a theatre with the forms of a school. Dramatic teachers are to-day, more than ever before, active in the search for and erection

of a philosophy and a science of the drama. See **DRAMA, THE**.

FRANKLIN H. SARGENT,
President American Academy of Dramatic Arts.

Schools of Library Economy. See **LIBRARY SCHOOLS.**

Schools of Technology. See **TECHNOLOGY, SCHOOLS OF.**

Schoolships and Nautical Training Schools.

The Secretary of the Navy was authorized by law, in 1874, and by later acts, to furnish, upon application in writing of the governor of the State, a suitable vessel of the navy, with all her apparel, charts, books and instruments of navigation, to be used for the benefit of any school or college having a branch established at each or any of the ports of New York, Boston, Philadelphia, Baltimore, Norfolk, San Francisco, Washington, Charleston, Savannah, Mobile, New Orleans, Baton Rouge, Galveston, and in Narragansett Bay, "upon the condition that there shall be maintained at such port a school or branch of a school, for the instruction of youths in navigation, seamanship, marine enginery and all matters pertaining to the proper construction, equipment and sailing of vessels, or any particular branch thereof." The President was authorized to detail proper officers of the navy as superintendents of or instructors in such schools. This permission has been taken advantage of by several States to secure a nautical training for young Americans.

In 1892 the steam sloop-of-war *Enterprise* was assigned by the United States government to the use of the Massachusetts Nautical Training School, and the *Enterprise* is now used as a schoolship for the purpose of instructing about one hundred young men, residents of that commonwealth, in the theory and practice of seamanship, and steam and electrical engineering. In 1904 Commander William F. Low, U. S. N., retired, was superintendent of the school, and Ensign William L. Varnum, U. S. N., retired, was executive officer. The commissioners were N. M. Dyer, Rear Admiral U. S. N., chairman; Robert B. Dixon, M.D., Hon. John Read, late U. S. N., and F. Stanhope Hill, late U. S. N., secretary. The report for the previous year showed an excellent record for the cadets, who must be between 16 and 20 years of age, of good character, sound constitution, enter the school of their own free will, and have an inclination for a seafaring life. A deposit of \$73 is required at entry. Some graduates of the school are in command of vessels, several served in the Spanish war in responsible positions, and a number of others are profitably employed.

New York also maintains a schoolship, the *Saint Mary's*, commanded by C. G. Hanus, commander, U. S. N., retired, assisted by officers who have had competent experience in the merchant service. Good character is a prerequisite for admission to the schoolship. The school proper is conducted much like any other school, but in addition to their regular studies the boys are constantly instructed in seamanship. The *Saint Mary's* made a cruise to European ports in 1903, and Commander C. G. Hanus reported that "the great majority of the boys are a fine, manly set of youths. Their conduct was such that it was favorably commented on in

every port we visited." The boys were permitted to visit Paris and other cities, while the vessel was in Cherbourg.

The full-rigged auxiliary ship, *Young America*, is being constructed at Perth Amboy, under the laws of the State of Rhode Island, as a nautical preparatory school. *Young America* is described as strictly speaking a floating school, in which, in addition to the regular curriculum which is taught at any first-class preparatory school, the pupils will have an opportunity to become instructed in those arts and sciences which go to the making of an efficient naval officer. Each four years *Young America* will start on an extended cruise, and the boys will visit various ports under the care of instructors. The cruise of the first year will cover not less than 16,000 miles; in the second year of eight and a half months the cruise will cover 24,000 miles; in the third year of ten months 26,000 miles will be covered, and in the fourth and last year 27,000 miles, so that in the four years of the course the boys will travel nearly 100,000 miles, and will visit all the principal ports of the world. The vessel being specially built for the uses intended, is in every respect a model nautical school.

Other States have in preparation or contemplation similar provision for the nautical training of American boys.

Schooner. See SAILING VESSELS; SHIPS, SAIL AND STEAM.

Schoorl, shoorl, Schorel, or Scorel, Jan van, Dutch painter: b. Schoorl, near Alkmaar, 1 Aug. 1495; d. Utrecht 6 Dec. 1569. At 14 he was placed with the painter Willem Cornelis. Three years later he traveled to Amsterdam, and spent some years in the studio of Jakob Cornelis, one of the most celebrated painters and engravers on wood of that period. He next became a pupil of John de Mabuse, in Utrecht, and subsequently visited many cities, including Cologne and Spire, where he studied architecture and perspective. He was received kindly by Dürer in Nuremberg. At 22 he passed through Carinthia to Venice, and thence to Palestine. For three years he remained within the walls of Jerusalem sketching views of the city and surrounding country. On his return he spent some time at Rhodes, and afterward at Rome, studying the works of Raphael, Michelangelo, and Giulio, till Adrian VI., a native of Utrecht, ascended the Papal chair in 1522, and committed to him the superintendence of the Belvedere. The death of Adrian the following year induced Schoorl to return home, which he did by way of France. He now executed many splendid pieces in Utrecht, afterward in Haarlem, and from time to time in other cities in the Netherlands. He has been compared with Jan van Eyck, whom he equaled in splendor and truth of coloring, in expression, in warmth of representation; and, at the most, was inferior to him only in the execution of particular parts. Unhappily the rage of the fanatics in a subsequent age for destroying pictures was fatal to many of his most valuable works. Consult: To-man, 'Studien über Jan van Scorel' (1889).

Schopenhauer, shō'p'en-how-ēr, Arthur, German philosopher and man of letters: b. Dantzic 22 Feb. 1788; d. Frankfort-on-

the-Main 21 Sept. 1860. He was of Dutch ancestry on both sides. His father, Heinrich Schopenhauer, was a rich merchant, whose love of freedom was so great that he removed to Hamburg in 1793, when his native city, Dantzic, lost its independence and became a part of Prussia. Schopenhauer's mother, whose maiden name was Johanna Troisner, was a woman of artistic temperament and literary aspirations, some 20 years younger than her husband. After his death in 1805, she removed to Weimar, becoming a member of the literary coterie there, and gaining a reputation as a popular novelist. Heinrich Schopenhauer, proud of his position as an independent merchant, determined that his son should succeed him as the head of the business which he had established. With this object in view, he had him instructed in modern languages, especially in French and English, and took the boy with him on extensive trips through England, France, Holland, and Germany, in order to give him a knowledge of the world. When Schopenhauer was 17, his father placed him in a business house in Hamburg. The work was distasteful to him and after his father's death, when he had vainly attempted to accommodate himself to a business career, he decided to follow his bent and devote himself to study. After receiving the necessary preliminary training at Gotha and Weimar, he entered the university at Göttingen in 1809, registering as a student in medicine. Later he studied in Berlin, where he heard lectures from Fichte and Schleiermacher, and finally received the degree of doctor of philosophy from the University of Jena in 1813, on submitting a thesis on "The Fourfold Root of the Principle of Sufficient Reason." After a residence of several years in Dresden, where he wrote his chief work, 'The World as Will and Idea' (*Die Welt als Wille und Vorstellung*, 1818), and a visit to Italy, he qualified as private lecturer (*Privat Dozent*) in the University of Berlin. He came there with the most extravagant estimate of the importance of his own views, and with the greatest contempt for the prevailing idealistic philosophy, of which Hegel, then at the height of his popularity at Berlin, was the chief representative. Schopenhauer announced lectures at the same hour when Hegel's principal course was given. As a result, his audience was very small; and, to make matters worse, his style of lecturing was not popular; his audience fell off, and the lectures had to be discontinued before the end of the semester. This embittered him still more, and he imagined that he was the victim of a deliberate plot on the part of various "school philosophers" who had conspired to prevent his views from obtaining a hearing. He made a second visit to Italy, lasting almost three years, but returned to Berlin in 1825, residing here, until 1831, when the epidemic of cholera that carried off Hegel, drove him to Frankfurt. Here (with the exception of a short stay at Mannheim) he continued until his death. Toward the close of his life his philosophy began to attract popular attention, and Schopenhauer eagerly received the admiration and recognition of a circle of devoted disciples. His old age was the most happy and serene period of his life, though his estimate of his own work was so high that it was not possible to satisfy his demands for recognition and adulation.

Schopenhauer maintains that philosophy can-



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not be a science; that is, a body of truths derived through logical processes, and open to anyone to learn with more or less trouble; but true philosophy is art, a revelation dependent on the intuitive insight of the man of genius. As in the case of a picture or musical composition, one will only perceive in a system of philosophy what one has the capacity to perceive. "There is no one philosophy," says Schopenhauer, "existing or acceptable for everybody. The difference in grades of intelligence is too great for that. The true philosophy, when it makes its appearance, will only command the attention of a few heads of the first order." To the circle of men of genius, then, Schopenhauer confidently claims to belong, and he expresses his contempt for the procedure of the savants who vainly seek philosophical truth by logical processes and accumulations of erudition. For Plato and Kant, Schopenhauer has the greatest admiration, and his own thoughts are constantly connected with their ideas. In Plato, what attracted him especially was the doctrine of an ideal world and its contrast with the unreality of the world of sensible phenomena. Kant maintained the same contrast, and Schopenhauer always claims to be the true successor of Kant, although he replaces the latter's table of twelve categories with the single principle of "sufficient reason," which appears in a fourfold form. With regard to Kant's doctrine that we cannot know the true nature of reality, Schopenhauer also differs from his master. Science is, indeed, limited to the world of phenomena. But we can know the nature of reality by a more direct and intimate method than that which science pursues. In the immediate consciousness of myself I know myself as will; this is the inside, the true reality of what appears objectively as body. After the analogy with ourselves everything is to be interpreted: in ourselves, we have the key that enables us to understand the world. The universe is in itself will. Like the individual, it has its phenomenal side, which can be known by the objective sciences. But its ultimate nature is will, blind, unconscious striving toward existence. The essence of each thing is found in its will. This essence manifests itself in various ways, and with varying degrees of consciousness, from the unconscious manifestations of inorganic forces like gravitation, to the conscious volitions of men. The doctrine that the essence of all things is will is the basis of Schopenhauer's Pessimism (q.v.), just as Hegel's view that reason is the ultimate ground of all things is the foundation of his optimism. Will, for Schopenhauer, is essentially and radically irrational. Under the concept of will he includes all desires, strivings, and impulses, all tendencies to change. These, Schopenhauer declares, are all manifestations of dissatisfaction and pain. Our life itself is essentially painful. Pleasure is merely negative, being nothing but the relief arising from the temporary cessation of our pain and desires. Since the will, both in us and in nature, is irrational in its inmost nature, there is no hope of things becoming better. Pessimism necessarily results from insight into the ultimate nature of things. Schopenhauer dwells with extraordinary eloquence on the unspeakable misery of life, and upon the aimless striving and irrationality that is everywhere manifested in

the world process. But yet, in a way, this insight into the worthlessness of existence brings with it a means of escape. Relief is possible only when the will is stilled and the desires and appetites are silent. Such redemption one can attain in the contemplation of works of art or in listening to music. In this artistic enjoyment our wants cease to exist, the attitude of will is canceled. This relief, from its very nature, can only be transitory. Final redemption from the will must come through ethics. We must perceive that all willing is vain and pleasure unattainable, and also that since individual existence is untrue and only phenomenal, all individuals are at bottom identical in essence, that is, all are manifestations of the one world will. This is to some extent effected through sympathy. There is, however, a higher and more complete virtue than sympathy. It is found in the complete negation of the individual will, the denial of the will to live, based on insight into the nothingness of finite existence. Of this negation of the will we have examples in Christian and Oriental asceticism. This denial of the will is holiness and blessedness in one. It is from the point of view of knowledge Nirvana, nothingness, yet in it the soul finds its highest peace and truest reality.

A complete edition of Schopenhauer's works, edited by Frauenstadt, appeared in 6 vols. (1873-4; 2d ed. 1877); by J. Gisebach (1890); and by Steiner in 13 vols. (1894). His 'Fourfold Root of the Principle of Sufficient Reason' is translated by Hillebrand in the Bohn Library (1894), together with his essay, 'On the Will in Nature.' 'The World as Will and Idea' has been translated by Haldane and Kemp (3 vols., 1884-6). 'The Two Fundamental Problems of Ethics,' translation in Bohn Library by B. Bax; 'The Art of Controversy,' translated by Saunders (1896). Consult, also: Zimmer, 'Schopenhauer, His Life and Philosophy' (1876); Wallace, 'Life of Arthur Schopenhauer' (1896); Caldwell, 'Schopenhauer's System in Its Philosophical Significance' (1896); Kuno Fischer, 'Arthur Schopenhauer' (1893); Sully, 'Pessimism' (2d ed., 1891); Ribot, 'La philosophie de Schopenhauer' (1874).

J. E. CREIGHTON,

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Schorn, shörn, Karl, German artist: b. Düsseldorf 16 Oct. 1803; d. Munich 7 Oct. 1850. He studied at Munich under Cornelius, and at Paris under Gros and Ingres, finally at Berlin under Wach. He was made professor at Munich in 1847. He assisted Cornelius with some of his large works, and designed the cartoon for a painted glass window in the cathedral of Ratisbon called 'The Conversion of Slaves by Saint Benno. He was employed by King Ludwig in collecting pictures to form the Munich gallery. His works were historical genre, such as 'Mary Stuart and Rizzio'; 'Charles V. in Convent of San Yuste'; 'Pope Paul III. before Luther's Picture,' in the National Gallery, Berlin; 'Cromwell before the Battle of Dunbar,' Königsberg Museum. He also painted the frescoes on the arcades of the Royal Garden, Munich.

Schottische, shō-tēsh', a somewhat fanciful name given to a slow modern dance in $\frac{3}{4}$ time.

Schouler, skoo'ler, James, American historian: b. Arlington, Mass., 3 March 1839. He

was graduated from Harvard in 1859, admitted to the bar in 1862 and built up a large practice which he was obliged to give up in 1865 because of deafness. He then devoted himself to literature almost exclusively until 1884 when he engaged successfully as a lecturer. He has since been lecturer at the Boston University Law School, at the National University Law School at Washington, and in 1891 was appointed lecturer on constitutional law and history at Johns Hopkins. His publications include: 'The Law of Domestic Relations' (1870); 'Executors and Administrators' (1883); 'Wills' (1887); 'History of the United States under the Constitution, 1783-1865' (6 vols., 1880-99); 'Life of Thomas Jefferson' (1897); 'Alexander Hamilton' (1901); etc.

Schouten, show'tën, **Willem Cornelis**, Dutch navigator: b. Hoorn 1567; d. Madagascar 1625. For several years previous to 1610 he was in the employ of the Dutch East India Company. He then determined to discover a new route to the Indies, and with Isaac Lemaire of Hoorn began the formation of a company with 200,000 florins capital, Schouten's share being one eighth. He sailed in command of an expedition 14 June 1615, was the first to round the cape which he called Cape Horn, and crossed the Pacific to Batavia. Here he was arrested for infringement of the East India Company's privileges; but on his return was acquitted, while the company was fined. He discovered Schouten Island on the northern coast of New Guinea.

Schrader, shrä'dër, **Frederick Franklin**, American journalist: b. Hamburg, Germany, 27 Oct. 1857. He removed to the United States in 1869, and has done journalistic work in many American cities. He is now (1904) the dramatic editor of the Washington 'Post.' He has published one novel 'Jose' (1900); and several plays, including: 'The Man from Texas'; 'Proposal by Proxy'; 'Hawkeye'; etc.

Schrader, Julius, German painter: b. Berlin 16 June 1815; d. Lichterfelde 16 Feb. 1900. He studied at the Berlin Academy and at Düsseldorf under Schadow, 1837-45. Subsequently he traveled in Italy, England, Holland, and Belgium, and in the last country fell under the influence of the colorists Gallait and Biefloe. In 1851 he became professor at the Berlin Academy. Among his chief works are: 'Surrender of Calais to Edward III.' (1847); 'Frederick the Great after the Battle of Kolin' (1849); 'Death of Leonardo da Vinci' (1851); 'Milton and His Daughters' (1855); 'Cromwell at the Death-bed of His Daughter' (1859). In fresco he painted 'First Twelve Christian Monarchs' in the Royal Chapel, and 'Consecration of the Church of Saint Sophia, Constantinople' in the New Museum, Berlin. Among his portraits are those of Humboldt and Ranke, the historian.

Schreiner, shrī'nër, **Olive** (better known by name of OLIVE SCHREINER CROWWRIGHT), pseudonym 'RALPH IRON,' South African author: b. Basutoland about 1860. In 1883 appeared 'Ralph Iron's' first work, 'The Story of an African Farm', a book of much interest with simple yet forceful pictures, from the Boer country. Further publications are: 'Dreams' (5th ed. 1893); 'Dream Life and Real Life' (1893); 'Trooper Peter Halket of Mashonaland' (1897); and 'An English South African's

View of the Situation' (1899); a critique on the Transvaal difficulty from the pro-Boer position. She was married in 1894 to S. C. Cronwright with whom she published 'The Political Situation' (1895).

Schrevelius, skrē-vē'lī-ūs, **Cornelius**, Dutch scholar: b. Haarlem, about 1615; d. about 1665. He became rector of the school of Leyden in 1642, and turned his attention exclusively to classical pursuits. His name is now principally known by a 'Manual Greek and Latin Dictionary' (1654), which has been often reprinted in most countries of Europe. An edition, with great improvements, by Fleury-Lécluse, appeared at Paris in 1820; and it was translated into English, with very extensive additions and improvements. He edited variorum editions of the following classics: 'Juvenal' (1648), 'Hesiod' (1650), 'Terence' (1651), 'Virgil' (1652), 'Horace' (1653), 'Homer' (1656), 'Martial' (1656), 'Lucan' (1658), 'Quintus Curtius' (1658), 'Justin' (1659), 'Cicero' (1661), 'Ovid' (1662), and 'Claudian' (1665).

Schreyer, shrī'ër, **Adolf**, German artist: b. Frankfort-on-the-Main 9 May 1828; d. Kronberg, Prussia, 29 July 1899. He studied at the Stadel Institut, Frankfort, then at Stuttgart, Munich and Düsseldorf and supplemented this school instruction by wide travels in Europe and the East. In 1862 he became court-painter to the grand duke of Mecklenburg-Schwerin. He was a member of the academies of Antwerp and Rotterdam. Before 1870 he lived much at Paris; but after that year lived alternately there and at Kronberg. He was an animal painter, especially choosing the horse for his model and depicting it in vigorous action or, when held in rein, with pawing feet and distended nostril. He was, also, a follower of Fromentin in his love of Eastern subjects, particularly mounted Arabs dressed in brilliantly colored clothes, surrounded by a heated palpitating atmosphere. Some of his pictures are 'Artillery attacked by Prussian Hussars' (1854); 'Wallachian Transportation Train in Rainy Weather,' at Hamburg; 'Charge of Artillery of the Imperial Guard' (1865), 'Horses of the Irregular Cossacks' (1864) at Paris. His 'Battle near Waghensel, in 1849' (1858); 'Battle of Komorn,' 'An Attack of Cavalry,' and 'Prince Thurn and Taxis wounded at Temisvár' are among his best known pictures, but are lodged in private galleries in Europe. Many canvases by Schreyer are to be found in the private collections of the United States, such as the Walters, the Vanderbilt, the Astor and the Huntington galleries. 'The Watering Place' is at the Corcoran Gallery at Washington.

Schubart, shoo'bärt, **Christian Friedrich Daniel**, German poet: b. Obersonthem, Swabia, 26 March 1739; d. Stuttgart, Germany, 10 Oct. 1791. He studied theology at Jena where he lived a dissipated life, and became musical director at Ludwigsburg in 1758, but was banished because of his dissolute conduct. After years of wandering he founded his 'Deutsche Chronik' at Augsburg in 1774, but was driven thence in 1777 and removed his 'Chronik' to Ulm. He there published a false report of the death of Maria Theresa and was imprisoned for 10 years when he was released at the demand of Frederick the Great in 1787. He then became musical and theatre director in Stuttgart and

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continued the publication of his paper under the title 'Vaterlands-Chronik.' He wrote: 'Gedichte aus dem Kerker' (1785); 'Hymnus auf Friedrich den Grossen' (1786); etc. His 'Gesammelte Schrifte und Schicksale' was published in eight volumes (1839-40). Consult Strauss 'Schubart's Leben in seinen Briefen' (1849).

Schubert, shoo'bért, **Franz Peter**, Austrian composer: b. Vienna 31 Jan. 1797; d. there 19 Nov. 1828. His extraordinary musical gifts were displayed at a very early age, and his talents were so pronounced that his teachers had little else to do but kindle the ever present though dormant spark.

Before he was 11 years old he was the leading soprano in the Lichtenthal choir, and he also played the violin solos in the services, besides composing songs and pieces for strings and piano. In his 12th year he entered the Imperial Convict, or school for educating choristers for the court chapel. His first piano composition, dated 8 April-1 May 1810, appears to have been a four-hand Fantasia, containing a dozen or more movements. While at the "Convict" he composed his first symphony, in D, in connection with the celebration of the birthday of Dr. Lang, the director of the school. His school-days at an end, he returned home about the end of October 1812, in which year his mother died. He then joined his father in school-work and for three years taught the primary class. Apart from his school duties he naturally devoted himself to composition, especially in the direction of setting words to music, to which he gave himself up with tremendous enthusiasm. His melodies seemed to be endless, his songs sprang into existence, and poets could scarcely write down their verses before Schubert had them set to music. In the intervals snatched from his regular duties, he found time to write eight operas, four masses, and other sacred works, besides a great number of songs. In 1817 he was enabled to throw off the fetters of his school work through the generosity of his friend Schober. From this time till his death there was only one brief decade, but the number of his compositions during that time is stupendous. He composed with the greatest ease and rapidity, and it is said that he could readily keep up a conversation while writing even his best pieces. He never hesitated, and seldom revised anything he wrote. His compositions included more than 70 part songs, some 18 works for the stage, 8 sacred pieces, 20 string quartets, 10 symphonies, and 24 pianoforte sonatas, but after all it was not through these that Schubert's name was immortalized, but through his songs, the titles of nearly 500 of which are recorded. They were full of dramatic intensity, poetry, and pathos, and full of music of infinite beauty set to long, complex poems, to which he arranged accompaniments of complete fitness and endless variety.

His engagement as teacher of music in the family of Count Esterhazy during the summer of 1818, at Zselésh, was the source of his first regular income. There were two daughters in the Esterhazy family, Marie and Caroline, and a little boy of five. The congenial occupation of teaching them was renewed later, in 1824, at which time he composed his 'Grand Duo' (opus 140), full of individualism and truly a symphonic work in its fullest sense. During

that summer he also composed his sonata in B \flat , the variations in A \flat , and a number of other pieces, presumably for use in the musical education of the Count's children.

To attempt to even mention any considerable number of Schubert's compositions here is manifestly impossible, but very complete lists of his works, arranged both alphabetically and also in the order of their composition, may be found in Grove's 'Dictionary of Music.'

One of Schubert's closest friends was Vogl, the tenor, through whose influence the attention of theatrical managers was attracted toward him. He had already written a comic operetta, the 'Zwillingsbrüder,' for the Kärntnerthor theatre, and not long after he was commissioned by a rival theatre to write the music for the 'Zauberharfe,' or 'Magic Harp,' which he is said to have completed in two weeks, and which was first performed on 19 Aug. 1820, in the Theatre an-der-Wien. During this year, too, he wrote several of his best songs, including the famous 'Im Walde' or 'Waldesnacht.'

In the following February, when Schubert was entering his 25th year, his talents began to receive recognition, and the publication of his songs was at last within sight. The 'Erl King' was chosen first and was published (on commission) on 1 April 1821, enough money having been subscribed at one of the Gundelhof concerts to defray the cost of printing, engraving, and still leave something over for future publications. Seven more songs (constituting op. 3 and 4) were published on 29 May, op. 5 on 9 July, op. 6 on 23 August, and op. 7 on 27 November. The next appeared on 9 May 1822, as "the property of the publishers," who now stopped publication by commission, realizing that they could assume the responsibility without risk.

In August 1821 he began his symphony in E, which, although he did not complete the writing of it, is remarkable for the rapidity with which it was composed. It is said that he probably did not occupy himself with it for more than a few hours, and yet it filled 167 pages. A month or two later he wrote two acts of 'Alfonso and Estrella,' the words being supplied by Schober. The third act was finished in February 1822, but no public performance of it was given until 26 years after Schubert's death, one cause of this delay being that the original accompaniments proved impossible for a band to play. During 1823 Schubert paid special attention to operatic music but without marked success, perhaps because the librettos were unsuitable. On this point Liszt regarded it as extraordinary that one who had been brought up to love the finest poetry should accept the absurd and impracticable librettos which were offered him, and which resulted in so much of his brilliant music being practically lost to the world. It was in this same year that his famous "Müller-lieder" were composed consisting of musical settings to Wilhelm Müller's poems, a copy of which he had borrowed from his friend Randhartinger when visiting him.

The rejection of his opera 'Fierabras' in 1824 filled him with distress, from which however he was aroused by the quiet joys of his second stay with the family of Count Esterhazy at Zselésh. During these happy days he

probably wrote his lovely string quartette in A minor and the 'Divertissement à la Hongroise' for four hands, as well as several other pieces already mentioned.

Some of his best compositions in 1826 were the string quartettes in D minor and G, the 'Rondeau brillant,' as well as the Sonata in G major, which Schumann regarded as his "most perfect work both in form and composition." The number of pieces published in that year was very large, showing that a popular demand for his music had arisen, but nevertheless Schubert was always poor, partly because his profits were so small, and partly because he allowed himself to be imposed upon by his friends.

The year of 1827 was notable as the one in which Beethoven died. He and Schubert had not been intimate, and the latter's visit to Beethoven in 1822 had ended disastrously, for on looking over the 'Variations' Beethoven had pointed out something which astonished him, whereupon Schubert is said to have lost his self-control and to have rushed from the room. In April of this year was written the beautiful 'Nachtgesang im Walde' for four men's voices and four horns, and a spring song for men's voices. In this year he was elected a member of the Musical Society of Vienna, which gave him considerable satisfaction.

The last year of Schubert's life, 1828, was remarkable for the number of his compositions, among which, writes Grove, were "his greatest known symphony (in C), his greatest and longest Mass, his first Oratorio, his finest piece of chamber music, three noble P. F. sonatas, and some astonishingly fine songs." On 26 March he gave his first evening concert in the hall of the Musik-Verein. The programme was very attractive and the applause great. In the month before he died he wrote a new 'Benedictus' to one of his Masses, wind-accompaniments to his 'Hymn to the Holy Ghost,' a long scena for a soprano voice, and a song entitled 'Die Taubenpost,' which is thought to have been his last composition. He was buried, in accordance with his dying wishes, in the Ortsfriedhof in the village of Währing, and in a grave only separated by two others from the one which held the remains of Beethoven.

Schubert's most prominent characteristics were truthfulness, honesty, good-humor, and a cheerful, contented disposition. With his intimates he was entirely at ease, genial and even boisterous at times, but at a fashionable gathering he was shy and silent. Of his musical genius no better description can be given than in the words of Liszt: "He was the most poetical musician that ever was; and the main characteristics of his music will always be its vivid personality, fulness, and poetry. In the case of other great composers, the mechanical skill and ingenuity, the very ease and absence of effort with which many of their effects are produced, or their pieces constructed, is a great element in the pleasure produced by their music. Not so with Schubert. In listening to him one is never betrayed into exclaiming 'how clever'; but very often, 'how poetical, how beautiful, how intensely Schubert.'" Consult: Ferris 'The Great German Composers' (1878); Kreissle von Hellborn, 'Franz Schubert, eine biographische Skizze' (1861-5; English translation 1869); Frost, 'Schubert' (1888).

Schultze, shoolt'sē, Carl Emil, American newspaper artist: b. Lexington, Ky., 25 May 1866. He was educated at Lexington and at Cassel, Germany, began drawing for newspapers and under the name of "Bunny" created the popular "Foxy Grandpa" series of comic pictures published since January 1900 in two New York journals. He is the author of 'Vaudevilles and Other Things' (1900); 'The Adventures of Foxy Grandpa' (1900); etc.

Schulz, shoalts, Leo, American musician: b. Posen, Germany, 28 March 1865. He was educated at Posen, came to the United States in 1889, was professor of the New England Conservatory until 1898, and since 1890 has been connected with the New York Philharmonic Society. He has published several volumes of musical compositions.

Schulze-Delitzsch, shoolt'sē-dā'tīch, Hermann, German politician and economist: b. Delitzsch, Prussian Saxony, 29 Aug. 1808; d. Potsdam 29 April 1883. After legal courses at Leipsic and Halle, he entered the Prussian public service; but from 1841 devoted his attention to the economic betterment of small farmers and artisans. Among his various activities, the most important was the establishment of the "people's bank" system, inaugurated at Delitzsch. In these banks, the subscribers made small deposits, obtaining proportional credit and dividends; the management being vested in a board composed of subscribers. In 1859 the more than 200 such banks were centrally organized under the direction of Schulze-Delitzsch. At the time of his death there were in Germany alone 3,500 branches, with more than \$100,000,000 in deposits; while the system had been extended to Austria, Italy, Belgium, and Russia. Consult his 'Vorschuss- und Kredit-Verzinsung als Volksbank' (5th ed. 1876); also the life by Bernstein (1879).

Schumann, shoo'mān, Clara Josephine Wieck, German pianist, wife of Robert Schumann: b. Leipsic 13 Sept. 1819; d. Frankfort-on-Main 20 May 1896. She was the daughter of the pianist Frederick Wieck, from whom she received instruction for 15 years and for the first time took part in a public concert in her 9th year. When Paganini appeared at Leipsic in 1829 he produced a profound impression upon her and her musical genius was developed still further by a tour with her father through the musical centres of Germany and France. While she derived her marvelous technique from her father, she was well grounded in the theory of music by Kupsch and H. Dorn. She was the first to bring Chopin's works into notice and favor with the German public. In 1840 she was married to Robert Schumann (q.v.) and shared his artistic work, and European successes until his death in 1856, after which she pursued her public career alone. In 1878 she was appointed teacher in the Conservatory of Frankfort-on-Main, where she met with success in that capacity, and continued to turn out a series of brilliant pupils until 1892. She was equally gifted as a performer, teacher and composer, and among her works at least 40 are in print and comprise songs, a concert for the piano, a trio for the piano, preludes and fugues.

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Schumann, Robert, German composer: composer: b. Zwickau, Saxony, 8 June 1810; d. Eendenich, near Bonn, 29 July 1856. His father, who was a bookseller and an author of some note, while not directly assisting him toward a musical career, encouraged him, and endeavored to obtain the services of Von Weber as his instructor. After his father's death, when Robert was 16, he attended the gymnasium at Zwickau, and later the University of Leipsic. At 17 he set a number of his own pieces to music. His academic work had been largely confined to law and philosophy, but at 20 he began serious piano study under Wieck and Heinrich Dorn. An unwisely chosen method, intended to secure independent action of his fingers, resulted in the crippling of one of the fingers of his right hand, which unfitted him for becoming a piano-player, and thenceforward he devoted himself to composing. In 1834 he assisted in founding, and until 1844 edited, a musical journal, the 'Neue Zeitschrift für Musik,' for advancing the art and emancipating it from old-fashioned methods and from French and Italian influences. Convinced that German art had not yet reached its full development, he thus expressed himself: "Consciously or unconsciously a new and as yet undeveloped school is being founded on the basis of the Beethoven-Schubert romanticism, a school which we may venture to expect will mark a special epoch in the history of art."

In 1833 Schumann occupied himself with studies in composition, and also published his first 'Impromptu' (op. 5). In this year, too, he commenced his 'F minor Sonata' (op. 11), and completed the toccata which he had commenced in 1829. A turning-point was reached in his life in October 1835 when Mendelssohn and he met at a musical gathering at Wieck's. A strong intimacy seems to have grown up between them. Schumann declared that Mendelssohn was the greatest living musician, and that he looked up to him as a "high mountain-peak." Mendelssohn at first saw in Schumann only the literary man and the art critic, but it is significant that when, in 1843, Mendelssohn established the Leipsic Conservatorium, Schumann was appointed teacher of playing from score. While there he introduced the use of the piano with pedals as a preparation for playing the organ.

Schumann's marriage in 1840 to Clara Wieck, daughter of his old teacher, was apparently a very happy one, and the fact that he soon afterward began to compose love songs does not weaken this belief. At the same time his wife regarded it as her greatest privilege to interpret his compositions faithfully to the public, nor was it long before she became the leading woman pianist of Germany. In the year after his marriage he paid more special attention to symphonic work, composing three entire numbers, only one of which, however—in B \flat —was published at that time. He also wrote the first movement of the 'Pianoforte Concerto in A minor.' In 1842 Schumann accompanied his wife on a concert tour to Hamburg. The latter proceeded alone from there to Copenhagen, while he returned to Leipsic. Later they visited Bohemia, and met Prince Metternich, at whose invitation they went to Vienna. In 1844 they traveled to Russia, Madame Schumann giv-

ing concerts in several of the large cities; but Schumann, who loved the quiet of domestic life, was always impatient to return home.

The style of Schumann's compositions underwent a decided change in 1843, the principal work of the year being 'Paradise and the Peri,' for solo voices, chorus, and orchestra. It was first performed on 4 December, and was conducted by Schumann in person. He also composed his popular 'Variations' for two pianos (op. 46), and from this time his reputation in Germany was firmly established. Thus encouraged, he began in the following year the second of his two most famous choral works consisting of a musical setting to Goethe's 'Faust.' About this time he gave up the editorship of his paper, and changed his residence to Dresden, where he at first lived in seclusion on account of his nervous condition, resulting doubtless from overwork. In 1845-6 he composed his 'Studies' and 'Sketches' for the pedal-piano, as well as his famous 'C major Symphony,' first produced by Mendelssohn at the Gewandhaus in Leipsic, 5 Nov. 1846. In Dresden he met Richard Wagner, for whose work he expressed great admiration, but on account of their very different natures they were never in close sympathy. The former was high-spirited and talkative, while Schumann, always reserved, was growing more and more silent. The idea of the improvement of German operatic music, long a favorite subject with Schumann, now led him to write an opera. He chose as his subject the legend of Saint Geneviève, but only after long and irritating delays was the first performance of 'Genoveva' arranged. This took place on 25 June 1850 under Schumann's own direction. The criticisms of this first attempt at dramatic work were on the whole unfavorable, and it is said that he derived far more gratification from the reception accorded to his music of 'Faust.' He also wrote an excellent musical setting for Byron's 'Manfred,' which had its first performance in Weimar 13 June 1852.

While living in Dresden he undertook the direction of the Liedertafel, and in 1848 he established a choral society. Two years later he accepted the position of municipal director of music at Düsseldorf. Here he had the direction of a vocal organization and an orchestra. His duties were sufficiently light, however, to leave him ample time for social enjoyment, in which he took great pleasure. His generous nature was manifested by his arrangement of a series of concerts, some of which were devoted wholly to the works of other living composers. This was in line with his desire to aid in advancing the interests of those less famous than himself. As a conductor Schumann was not regarded as a success. His lack of presence of mind and of sympathy with the players was conspicuous, and contributed largely to his unpopularity as a leader. This unfortunate condition of things, combined with the return of a brain affection, symptoms of which had been first manifested as far back as 1833, at length made it necessary for him to resign his post, which he did in 1853. During his residence in Düsseldorf the number of his compositions was very great, including the celebrated 'E \flat Symphony,' which, it is believed, was intended to convey by musical expression the impressions he received during a visit to Cologne. It was

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first performed on 6 Feb. 1851, almost exactly three years before that sad day when, in a state of utter mental distraction, he sought to end his life by jumping into the Rhine. He was saved by some boatmen, but unmistakable signs of insanity soon appeared, although for a brief period later his mind became wonderfully calm and clear, and with it returned his old love of work. His mental powers were shattered, however, and the last two years of his life were spent in an asylum at Eendenich. He was buried at Bonn. A monument over his grave was unveiled on 2 May 1880.

Schumann's works present a rare combination of passion and tenderness. He did much for the development of piano-playing, and his numerous songs reveal the grandeur and depth of his unselfish nature. His compositions consist of orchestral works, vocal works with orchestral accompaniment, choruses, a large number of songs, chamber music, and also many pieces for the organ and piano. Striking features of Schumann as a composer are his originality and his cautious approach to the more difficult classes of work. At the outset of his career he chose simple forms, building several together for his longer pieces. From this method, however, resulted no unevenness or inharmoniousness, a fact which bears strong witness to the greatness of his creative abilities. In the composition of songs Schumann must be conceded to take rank with such composers as Schubert and Mendelssohn. As one of his biographers writes: "Schubert shows the greatest wealth of melody, Mendelssohn the most perfect roundness of form; but Schumann is by far the most profoundly and intellectually suggestive."

Until Schumann reached his 30th year he wrote almost entirely for the piano, and his method of treating the instrument must be regarded as strictly original. He followed none of the methods of the older composers, although he was evidently familiar with their work. His earlier compositions strike the hearer as the result of sudden impulses, and therefore contain much that is apparently at variance with the established laws of art, but this in no wise detracts from, but rather adds to, the freshness and originality of their conception.

His symphonies are generally regarded as the most important contributions of this class since the time of Beethoven, whom he approached quite nearly at times, and whose works occasionally served as his models. His love for sacred music was developed only a few years before his death. In writing to a friend in 1851 he said: "It must always be the artist's highest aim to apply his powers to sacred music. But in youth we are firmly rooted to the earth by all our joys and sorrows; it is only with advancing age that the branches stretch higher, and so I hope that the period of my higher efforts is no longer distant." Several compositions of this class are recorded, one of the most famous being op. 71, an Advent hymn for solo, chorus, and orchestra; op. 93, a motet for men's voices; op. 144, a New Year's hymn for chorus and orchestra; his 'Mass,' op. 147, and a 'Requiem,' op. 148. These, while not counted among his greatest works, were grandly conceived, and with his other compositions must be a lasting monument to his imperishable genius.

A list of Schumann's works may be found in the catalogue of Schuberth & Co. (1860-1), while a complete index to all his published compositions was compiled by Alfred Dörfel and was printed as a supplement to the 'Musikalisches Wochenblatt' (Leipsic 1875).

R. I. GEARE,

National Museum, Washington, D. C.

Schurman, shoor'man, Jacob Gould, American educator: b. Freetown, Prince Edward Island, 22 May 1854. His father was descended from Dutch stock and his mother was an Englishwoman. He was educated in the provinces where he gained the Gilchrist Dominion Scholarship in 1875 and studied later at London and Edinburgh universities. He was elected to the Hibbert traveling fellowship in 1878 and spent two years at Heidelberg, Berlin and Göttingen mainly occupied with the study of philosophy. In 1880 he became professor of philosophy and English literature at Acadia College, Nova Scotia, and in 1882 removed to a similar post at Dalhousie College. In 1886 he became professor of philosophy at Cornell University and in 1890 was made dean of the Sage School of Philosophy there. In 1892 he was elected to the presidency of the university. He was appointed by President McKinley chairman of the United States Philippine commission in 1899 and spent the larger part of that year in the Philippine Islands. His published works are 'Kantian Ethics and the Ethics of Evolution' (1881); 'The Ethical Import of Darwinism' (1888); 'Belief in God' (1890); 'Agnosticism and Religion' (1896); 'A Generation of Cornell' (1898); 'Philippine Affairs—A Retrospect and Outlook' (1902). He is also joint author of the 'Report of the Philippine Commission' rendered to Congress in 1900.

Schurz, shoorts, Carl, German-American publicist, editor, and author: b. Liblar, near Cologne, Prussia, 2 March 1829; d. New York City, 14 May 1906. He studied at the University of Bonn, in 1848 with others published a revolutionary journal, in 1849 escaped to the Palatinate upon the failure of an insurrection which he promoted at Bonn, took part in the defense of Rastadt, and upon its surrender fled to Switzerland. In 1850 he returned to Germany, going thence to Scotland and to Paris, where he was a correspondent for the German press, and, after a year in London, came to the United States (1852), where until 1855 he resided in Philadelphia. Having then removed to Madison, Wis., he identified himself with the Republican party, and by his speeches made himself an important factor in determining the German element of the State against slavery. He participated in the Lincoln-Douglas senatorial canvass in Illinois, entered legal practice at Milwaukee, was a member of the national Republican convention of 1860, and assisted largely in the framing of its platform. During the ensuing campaign he spoke much in both German and English. He was appointed by Lincoln minister to Spain, but in December 1861 resigned to enter the army, receiving a commission as brigadier-general of volunteers. He distinguished himself at the second Bull Run (Manassas), was promoted major-general 14 March 1863, commanded a division at Chancellorsville, held temporary command of the 11th corps at Gettysburg, and took part at Chattanooga. After

the war he returned to professional practice, in 1865-6 was Washington correspondent of the *New York Tribune*, and was made by President Johnson a special commissioner to report on the workings of the Freedmen's Bureau. In 1868 he was temporary chairman of the convention that nominated Grant, whom he actively supported in campaign. In 1869-75 he was senator from Missouri. He vigorously opposed many of the leading measures of the Grant administration, in 1872 helped to organize the 'Liberal' party and presided over the Cincinnati convention which nominated Greeley, but in 1876 supported Hayes, by whom he was made secretary of the interior. He introduced competitive examinations for posts in the civil service, and provided for forest protection on public domains. From the close of the administration to 1884 he was editor of the *New York Evening Post*. In the canvasses of 1884, 1888, and 1892 he supported Cleveland. He had been prominently identified with the Civil Service Reform League, and later with the Anti-Imperialist League. His speeches and contributions to periodicals were numerous and able. Among his many publications are: a volume of 'Speeches' (1861), a 'Life of Clay' (1887), and 'Abraham Lincoln: An Essay' (1891).

Schuvaloff, shoó'vā-lōf, **Peter Andreievitch**, COUNT, Russian diplomat: b. Saint Petersburg, Russia, 15 July 1827; d. there 22 March 1889. He early entered the army, rose to the rank of general at 30, was head of a department in the ministry of the interior in 1862, governor of the Baltic provinces in 1864-6, and in the latter year was appointed chief of the secret service. He was sent to London in 1873 as special ambassador and arranged the marriage between the daughter of Alexander II., and the Duke of Edinburgh. In 1878 he was a representative at the Congress of Berlin, and later as ambassador to England he was instrumental in preserving friendly relations between Great Britain and Russia after the Russo-Turkish war of 1877-8.

Schuyler, ski'lér, **Aaron**, American educator: b. Seneca County, N. Y., 7 Feb. 1828. He was educated at Seneca Academy, Ohio, and was its principal 1851-62. He was professor of mathematics at Baldwin University, Ohio, 1862-75, and president, 1875-85. In the last named year he became president of Kansas Wesleyan University at Salina, and six years later assumed the professorship of philosophy and higher mathematics which he still holds. He is the author of various text-books on mathematics, logic, psychology, ethics, and social science.

Schuyler, Eugene, American diplomat: b. Ithaca, N. Y., 26 Feb. 1840; d. Cairo, Egypt, 18 July 1890. He was graduated at Yale in 1859 and at Columbia Law School in 1863. After practising law he entered the diplomatic service in 1866, was consul at Moscow and Reval, and secretary of legation at Saint Petersburg, 1870-6. In 1876 he was transferred to Constantinople and that year, after careful investigations, rendered an important report on the Turkish massacres in Bulgaria. In 1878 he was consul at Birmingham; the next year, consul-general at Rome, and in 1880 became *chargé d'affaires* and consul-general at Bucharest. In 1881 the United States government authorized him to arrange and sign the commercial and consular

treaties with Rumania and Servia and in the following year he assumed toward those two countries and Greece the post of minister-resident and consul-general. In 1889 he became consul-general at Cairo. He published 'Peter the Great, Emperor of Russia' (1884); 'Turkestan: Notes of a Journey in Russian Turkestan, Khokand, Bokhara and Kuldja' (1876); 'American Diplomacy and the Furtherance of Commerce' (1886). He also made translations from Tolstoi and Turgenieff.

Schuyler, Montgomery, American journalist: b. Ithaca, N. Y., 19 Aug. 1843. He was educated at Hobart College, served in the Union army in 1862-3, was on the staff of the *New York World* in 1865-83, since when he has been on the editorial staff of the *New York Times*. He has published: 'The Brooklyn Bridge' with W. C. Conant; 'Studies in American Architecture.'

Schuyler, Philip John, American soldier: b. Albany, N. Y., 20 Nov. 1733; d. 18 Nov. 1804. He was the second son of John Schuyler, owner of a large estate near Albany. He served in the French and Indian war in two campaigns (1755-8), first as captain and afterward as commissary with the rank of major. In 1761 he went to England to settle the colonial claims. Returning in 1763 he successfully engaged in the lumber business at Saratoga. He built the first flax mill in America. In 1764 he acted as a boundary commissioner to determine the line between New York and Massachusetts, and later helped settle the New Hampshire boundary. In 1768 he was chosen as Albany's representative in the colonial assembly, where he earnestly defended the side of the colonists. In 1775 he was a delegate to the Continental Congress and served on the committee to frame rules and regulations for the Continental army. He was appointed (19 June 1775) major-general and placed in command of the department of northern New York, with headquarters at Albany. He planned to invade Canada and proceeded as far as Lake Champlain, where he left General Richard Montgomery in command of Fort Ticonderoga, while he returned to Albany to raise more troops and forward supplies. Early in 1776 he led an expedition to Johnstown, N. Y., where he captured the military stores of the British. Owing to a clash with General Horatio Gates he offered his resignation (14 Sept. 1776), which Congress would not accept. In 1777 he was appointed chief of the Pennsylvania militia, and in June was again placed in command in northern New York. On 4 July 1777 Ticonderoga was evacuated by General Arthur Saint Clair, and later General Schuyler was tried by court-martial for alleged neglect of duty in permitting its capture. He was acquitted and completely vindicated. On 29 July 1777, he evacuated Fort Edward and retreated down the Mohawk valley before Burgoyne. Notwithstanding the patriot success at Bennington (16 August), he was superseded by Gates (19 August), yet he remained with the army and to him belongs the credit of effecting Burgoyne's surrender (19 October). He was again a delegate to the Continental Congress (1778-81) and his counsels were often sought by Washington. As president of the board of Indian commissioners he visited the tribes of the Six Nations

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and made treaties that secured their neutrality. He was a member of the New York senate (1780-4, 1786-90, and 1792-7) and actively promoted the building of a canal between the Hudson and Lake Erie. He was United States senator from New York (1789-91 and 1797-8). He resigned because of ill-health. He was married (17 Sept. 1755) to Catharine Van Rensselaer and had 11 children. His daughter Elizabeth became the wife of Alexander Hamilton. Consult: Lossing, 'Life and Times of Philip Schuyler' (1860-2; 2d ed. 1872); Tuckerman, 'Life of General Philip Schuyler' (1903).

Schuylerville, ski'lér-víl, N. Y., village, Saratoga County; on the Hudson River, and on the Fitchburg railroad; about 10 miles east of Saratoga Springs and 35 miles north of Albany. It was named in honor of Philip Schuyler (q.v.) who planned the campaign against Burgoyne. The village is in an agricultural region, and has a number of industries connected with farm and dairy products. It is a favorite summer resort; and many tourists visit the village on account of its historical associations. A tablet on one of the business blocks gives the information that near is the place where Burgoyne surrendered to Gates. A half mile up the slope from the main street stands the Saratoga Battle monument, erected by the Saratoga Battle Monument Association. The cornerstone was laid on the 100th anniversary of the Burgoyne surrender, 17 Oct. 1877. It is ornamented on each side of its four fronts by niches, three of them containing bronze statues of Generals Schuyler, Gates and Morgan. The south niche, where would have been placed the statue of Benedict Arnold, stands empty. All roads from Schuylerville seem to lead to battlefields whereon were fought and won the independence of the Republic. Pop. (1890) 1,387; (1900) 1,601; (1910) 1,614.

Schuylkill, skool'kíl (from the Dutch, meaning "hidden channel"), a river in Pennsylvania, which has its rise in Schuylkill County, flows southeast and enters the Delaware River at Philadelphia. The total length is about 125 miles. In 1816-25 the river was made navigable for freight boats to Port Carbon, three miles above Pottsville (q.v.). Philadelphia obtains from the Schuylkill a large part of the city water supply. The river furnishes considerable water-power which is used for manufacturing at Pottsville, Reading, Norristown, and other places on its banks, and also at Philadelphia.

Schwab, shwáb, **John Christopher**, American political economist: b. New York 1865. He was graduated from Yale in 1886 and later studied at the universities of Berlin and Göttingen. He has been editor of the Yale 'Review' since 1892, and has occupied the chair of political economy at Yale since 1898. He has published: 'History of New York Property Tax' (1890); 'The Confederate States of America' (1901); etc.

Schwanthaler, shvân'tä"lër, **Ludwig von**, German sculptor: b. Munich 26 Aug. 1802; d. there 28 Nov. 1848. He attended the Art Academy at Munich and was a pupil of the battle painter Albrecht Adam; but in 1821 took up his father's profession of sculpture and at once received a commission from King Maximilian to furnish a model for a silver épergne decorated with incidents from the fable of Prometheus.

After a year's travel in Italy (1827) he executed the figures for the Ægina Gallery of the Glyptothek at Munich, and other decorative work for the same building. His 'Shakespeare' in the vestibule of the theatre in his native city belongs to this period, as does the Bacchus-frieze in the ballroom in the palace of Duke Max. On being appointed professor in the Art Academy at Munich he soon gathered a great number of pupils about him. He was meanwhile busy in numerous important works; a frieze illustrating the 'Voyage of the Argonauts'; a statue, 'Poetry of Hesiod'; the reliefs illustrative of Pindar; the statues of Æschylus, Sophocles, and Aristophanes; the reliefs illustrating the myth of Aphrodite. Of his monumental work in marble and bronze, are the pediment groups in the Walhalla, consisting of 15 statues illustrating the 'Victory of Arminius over Varus'; and the two pediment groups for the Munich propylæum. The greatest, however, of his works of this class is the figure of 'Bavaria,' more than 20 feet in height, for the Hall of Fame in Munich. He has also executed many statues of notable individuals. Among his ideal works are the life size figures in sandstone of 'Venus'; 'Diana'; 'Vesta and Ceres'; 'Apollo'; 'Eros'; 'Bacchus'; and 'Pan.' This series was completed in 1840 for the castle of Wiesbaden. His 'Dancing Girl,' a life size figure in white marble, is a work of remarkable beauty. His 'Shield of Hercules,' begun at Rome, is conceived in the pure classic spirit. It illustrates, after Hesiod, that divinity's exploits, etc., in 140 figures; has been cast in bronze, and replicas are to be found both in Germany and England. He was a sculptor of the Romantic school and his works did much to promote the cause of Romanticism, an art cause which lost much by his death. While several of his works exhibit great spontaneity, sometimes he over-elaborates to such a degree, as to impair the force of his original conception.

Schwartz, shvårts, **Christian Friedrich**, German Protestant missionary: b. Sonnenburg, Prussia, 26 Oct. 1726; d. Tanjore, India, 13 Feb. 1798. He was educated at the University of Halle, 1746-9, ordained at Copenhagen, and sailed from London for India in 1750. He was stationed at Tranquebar, a Danish mission, until 1766, when, having transferred himself to the English Society for Promoting Christian Knowledge, he removed to Trichinopoly and founded a church and a school. He removed to Tanjore, in 1778, and went as an ambassador to negotiate peace with Hyder Ali, at Seringapatam, in which he was successful after all others had failed. In a later war he succeeded in saving the city of Tanjore from famine by his influence with the peasants, whom he induced to send supplies. He gained the friendship of the rajah of Tanjore and of Hyder Ali, and the former, on his death-bed, entrusted his son and successor to the missionary's care. A monument designed by Flaxman and erected at Tanjore commemorates the young rajah's gratitude for his tutor, while another, at Madras testifies to the general appreciation of the services of Schwartz in India. Consult Pearson, 'Memoirs of the Life and Correspondence of C. F. Schwartz' (1833).

Schwarz, Berthold, a Franciscan friar of Freiburg or Dordmund; d. Venice 1384. His real name was Constantin Anklitzen: Berthold was

his monastic name, and the epithet Schwarz, "black," was added to it, because of his addiction to the study of chemistry, in the course of which he is supposed to have discovered an explosive, formed by the combination of saltpetre, sulphur and quicksilver; or of saltpetre, sulphur, lead and oil. Thus he is sometimes credited with the invention of gunpowder. This is said to have taken place in the early part of the 14th century. Schwarz, whether the inventor of gunpowder or not, was undoubtedly the inventor of artillery. In 1380 he came to Venice, and was commissioned by the government to cast some cannons, which are described as of an enormous size. The price agreed upon for his work not being forthcoming he became importunate, and was rewarded by being cast into prison, where he died. In 1853 a statue was erected to him in Freiburg. Consult: Hansjakob, 'Der schwarze Berthold, der Erfinder des Schiesspulvers' (1891). See GUNPOWDER.

Schwarzenberg, shvārt'sēn-bērg, Adam of, Franconian count: b. 1587; d. Spandau, Prussia, 17 March 1641. He was descended from one of the oldest families of Franconia, was prime minister to Georg-Wilhelm, the elector of Brandenburg, was all-powerful during the Thirty Years' war, and caused great calamities to the electorate of Brandenburg through his promoting an alliance with Austria against the Swedish Protestant League. When the "Great Elector" assumed the reins of government in 1640 he punished Schwarzenberg by divesting him of his power and imprisoning him in the fortress of Spandau, where he died.

Schwarzenberg, Karl Phillip of, Franco-nian prince and soldier: b. Vienna, Austria, 15 April 1771; d. Leipsic, Germany, 15 Oct. 1820. He received a military training and served with distinction in the battles of Wagram, Hohenlinden, and Ulm, and after the peace of Vienna 1809, was Austrian ambassador to Paris, where he is said to have arranged the marriage between Maria Louisa and Napoleon. At Napoleon's request he was created a field-marshal and, in 1813, placed at the head of the Austrian army of observation in Bohemia. When Austria joined Russia and Prussia, Prince Schwarzenberg commanded the allied forces, gained the battle of Leipsic, and led the victorious armies into Paris 1813. Consult Prokesch-Osten, 'Denkwürdigkeiten aus dem Leben des Feldmarshalls Fürsten Schwarzenberg' (1882).

Schwatka, shwāt'ka, Frederick, American Arctic explorer: b. Galena, Ill., 29 Sept. 1849; d. Portland, Ore., 2 Nov. 1892. He was graduated at West Point in 1871, served as 2d lieutenant, U. S. A., until 1878, when he obtained leave of absence and headed an expedition to King William's Land, in search of records and remains of Sir John Franklin's Arctic exploring party. He was successful and brought back in 1880 some valuable geographical information as well as the buried records, having made a sledge journey of 3,251 miles, then the longest on record. Schwatka next explored the Yukon River in Alaska, and returning in 1884, resigned his army commission, having meantime been promoted to 1st lieutenant. He led three other exploring expeditions: one to Mount Saint Elias, which he ascended for 7,200 feet, for the New York 'Times' in 1886; one in 1891 to Alaska,

opening up some 700 miles of new territory; one in 1889 to Chihuahua in Mexico, for the journal 'America.' He was the recipient of the Roquette Arctic medal from the Paris Geographical Society, of a medal from the Imperial Geographical Society of Russia and of honors from geographical societies of Rome, Berlin, and Geneva. He was the author of 'Along Alaska's Great River' (1885); 'Nimrod in the North' (1885); 'The Children of the Cold' (1886). Consult Gilder's 'Schwatka's Search' (1881).

Schweinfurth, shvin'foort, Georg August, German explorer and botanist: b. Riga 29 Dec. 1836. He was educated at Heidelberg, and in 1863-6 explored the valley of the Nile and the African coast of the Red Sea; in 1869-71 he explored equatorial Africa in the countries of the Bongo, Madi, Dinka and other peoples, and discovered a tribe of pigmies and the river Welle. He founded the Egyptian Geographical Society 1872, and in 1880 became the director of all the Egyptian collections in Cairo. In other explorations he investigated the oasis of El-Chargeh; the botany of various districts of Egypt; the southern portion of Arabia; and Helouan and the Italian colony of Erythrea. His publications chiefly relate to travel and botany, and include 'Plantæ quædam Niloticæ' (1862); 'Im Herzen von Afrika' (1874); 'Artes Africanæ' (1875); etc.

Schweinitz, shvi'nits, Emil Alexander de, American bacteriologist: b. Salem, N. C., 18 Jan. 1866; d. Washington, D. C., 15 Feb. 1904. He was graduated from the University of North Carolina in 1882, subsequently studying at Göttingen and taking a medical degree at Columbian University, Washington. He was dean and professor at the Columbian Medical School and director of the biochemic laboratory of the Department of Agriculture at Washington, and made many original investigations in regard to bacteria, tuberculosis, disinfectants and hygienic problems. The results of these investigations appeared in numerous published scientific papers.

Schweinitz, Rudolf, German sculptor: b. Charlottenburg 15 Jan. 1839; d. Berlin 8 Jan. 1896. He was a pupil of the Berlin Academy and of Schiövelbein, took a prominent part in the decoration of the National Gallery at Berlin, and executed numerous commissions for monuments, public works, and official buildings. Among his works were many busts, such as those of Crown Prince Frederick William (1872) and William I. (1882) in marble. The memorial of William I. and Frederick III. at Fürstenwalde is also by him, as are also 20 decorative statues for the equestrian memorial of Frederick William III. at Cologne.

Schwenkfeld, shvĕnk'fĕlt, Kaspar von, German mystic and religious leader: b. Ossig, Silesia, 1490; d. Ulm 10 Dec. 1561. He studied at Cologne and other universities, in 1516 entered the service of the Duke of Liegnitz, and was made a councillor. A learned scholar, he differed from Luther on several points of theology, and was thus opposed by both Catholics and Protestants. His writings are of interest in the study of the times of the Reformation. Those who adhered to his views were subjected to greater or less persecution and in 1734 many emigrated to Pennsylvania, where they settled in

Montgomery and adjacent counties. There they maintain a few small churches, the doctrines, discipline and government of which in many particulars resemble those of the Society of Friends. The Schwenkfelders or Schwenkfeldians have sometimes been erroneously identified with the Dunkards (q.v.). Consult Kadelbach, 'Ausführliche Geschichte Kaspar von Schwenkfelds und der Schwenkfelder in Schlesien, der Ober-Lausitz und Amerika (1861).

Schwenkfeldians, shwĕnk'fĕl-dī-anz. See RELIGIOUS SECTS.

Schwerin, shvā-rĕn', Germany, capital of the grand duchy of Mecklenburg-Schwerin, picturesquely situated on the west shore of the Lake of Schwerin, 20 miles south of the Baltic, and 130 miles northwest of Berlin. The lake is 14 miles long and 3 broad, and has smaller lakes behind it. The town is surrounded with handsome suburbs and contains the grand duke's castle (1845-58), a Renaissance structure, the cathedral (1365-1430), with interesting monuments and stained glass; an arsenal; a museum and picture-gallery; and manufactures lacquered wares, machinery, cloth, etc. Pop. about 42,000.

Schwind, shvĭnt, **Moritz von**, Austrian painter: b. Vienna 21 Jan. 1804; d. Munich 8 Feb. 1871. He was a pupil of the Vienna and Munich academies, and in 1832-4 decorated a room in the Königsbau with encaustic pictures; in 1834-5 he undertook one of his greatest works, the painting of 60 compositions in water-color for Castle Hohenschwangau; became a professor in the Munich Academy in 1847; in 1854-5 painted the frescoes in Wartburg, and in 1864-7 those in the Vienna Opera House. He was a member of the Berlin, Vienna, Paris, and other academies, and was knighted in 1855. He is considered one of the foremost of modern painters and the best representative of German romanticism. He worked as well in fresco, oils, or water-colors, and his compositions number several hundreds.

Schwyz, shvĭts, Switzerland, capital of the canton of Schwyz, on the Gotthard Railroad, 3 miles northeast of the Lake of Lucerne. The interesting old town-hall contains the earliest trophies of the Swiss struggles for independence. There are also a handsome church and several higher educational institutions. The chief industries are cotton spinning and the manufacture of bricks. Fruit and cattle raising are extensively carried on in the neighborhood. Population about 9,000. Schwyz took such a conspicuous and leading part in the revolts against the House of Hapsburg, that its name was applied to the whole of the Swiss Confederacy.

Sciaccia, shāk'kā, Italy, a seaport town and bishop's see in Sicily, in the province of Girgenti, 30 miles northwest of Girgenti on a sloping hill. It is badly built; its principal buildings are the cathedral (11th century), some ancient castles, and a technical school and gymnasium. It is the Sicilian headquarters of Mediterranean coral fishing. There are manufactures of bricks, pottery, barrels, baskets, olive oil, and many persons are employed in fish-curing. Pop. about 27,000.

Scianidae, sī-ĕn'ī-dĕ, a family of percomorphous, spiny-rayed teleostomous fishes, in

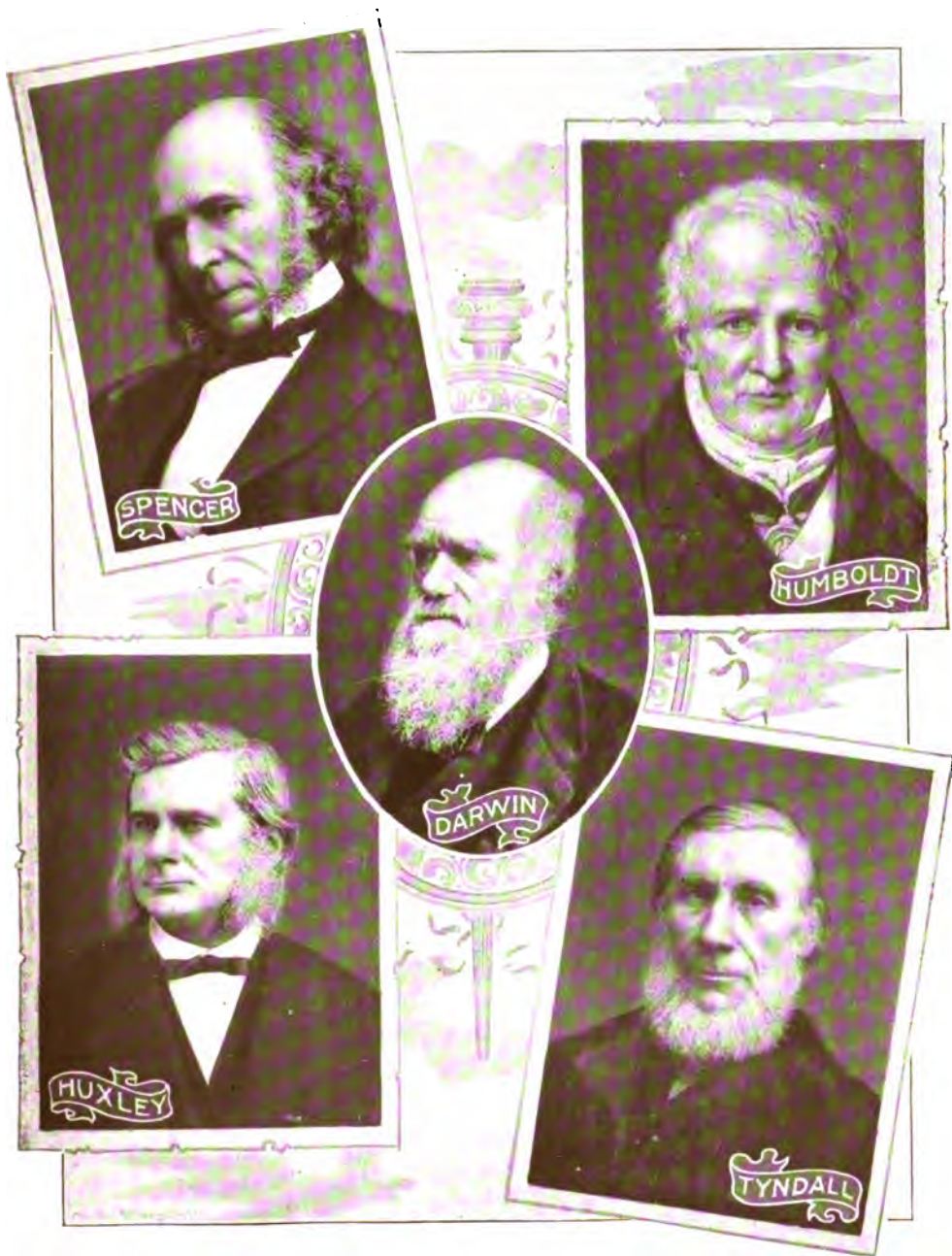
which the body is usually slightly compressed and elongated and covered with thin, slightly ctenoid scales. The head is scaly and its superficial bones are remarkable for the extensive development in them of passages for the mucous canals. The premaxillary bones are protractile and the chin is provided with pores and sometimes a barbel. Jaw teeth are well developed but, beyond the formation of enlarged canines, are not differentiated, but large molar teeth may pave the pharyngeal bones. The fins are well developed, the soft dorsal long, the caudal usually rounded or truncate and the anal short and preceded by one or two spines, never more. With few exceptions the air-bladder is large and of complicated structure; and it is by forcing air through this organ that the peculiar grunting and rumbling sounds produced by these fishes are caused. Most of the species are marine and littoral, but a few are fresh-water. Most of them feed upon other fishes but some upon crustaceans and mollusks. The family is an extensive one of 30 genera and about 150 species widely distributed and especially numerous in warm seas, and most of them are good food-fishes. Nearly all of the genera and more than 100 species are recorded as occurring in North American waters, including some food-fishes of first-rate importance and several game-fish. There may be mentioned as belonging here the weakfishes, drums, croakers, kingfish, spot and yellowtail.

Sciatica, sī-āt'ī-ka, a neural affection, in which the pain stretches along the course of the great sciatic nerve, that is, from the hip along the back part of the thigh toward the ham of the leg. It may affect the branches of this nerve, and any nerve of the thigh or hip. It is characterized by extreme pain, often excruciating and occurring in paroxysms, and increased by any change of temperature and moisture; there is stiffness, and generally swelling of the limb at the beginning of the disease, but after repeated attacks the limb seems to shrink, owing to the wasting of the muscles. In some cases the articulation of the hip seems affected, and permanent immobility of the limb takes place. If sciatica appears, as it commonly does, as a severe form of neuralgia, it is treated in the same manner as that disease; if it is a complication of gout, rheumatism, etc., the treatment must have reference to the primary disease. See NEURALGIA; NEURITIS.

Scidmore, skid'mōr, **Eliza Ruhamah**, American traveler and author: b. Madison, Wis., 14 Oct. 1856. She became identified with the National Geographic Society at Washington, D. C., in 1890, and later its corresponding and foreign secretary. Her published works are: 'Alaska: The Southern Coast and the Sitkan Archipelago' (1885); 'Westward to the Far East'; 'From East to West'; 'Guide to Alaska' (1890-8); 'Java: the Garden of the East' (1897); 'Winter India' (1903); etc.

Science of Language, that science which treats of language as an organic phenomenon to be examined and classified in accordance with the results of inductive processes.

The science of language in its broadest sense embraces all efforts to observe and study the facts of human speech as detached from their subjective identity with thought and viewed ob-



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jectively as parts of a mechanism for the communication of thought. In this sense its history reaches back to include the beginnings of descriptive grammar, which represents in general an attempt to classify the facts of a language as they appear in use for the purpose of understanding, teaching, and preserving it. Grammar took its rise under the influence of writing, and with the motive apparently in all cases of retaining and establishing the use or understanding of some literary dialect as a standard type. This is the case notably in India, where the native grammar served the purpose of enabling the Brahmins to hand down by teaching the exact traditions of the sacred language of the Vedas esteemed to be in their keeping, and among the Greeks it was in connection with the teaching and interpretation of Homer, and later when the Greek language had spread beyond the limits of Greece, in connection with teaching the language to aliens and maintaining its standards unimpaired, that the system of Greek grammar had its development.

Though among other peoples, as the Chinese and the Assyrians, word-lists or syllable-lists were made with some attempts at definition and grammatical explanation, it is only at two points in the history of human endeavor, in India and in Greece, that anything approaching complete grammatical systems has been produced. All forms of descriptive grammar that have thus far been used in the world for the full exposition of any language may be directly traced to one of these two independent sources. Thus for example, the grammar of the Romans, including the technical terms and classifications such as the names of the cases, tenses, and parts of speech, was obtained from the Greeks by a direct translation, often most crude and mistaken, and this Latin grammar in its turn was forced upon the modern languages of Europe with ruthless disregard of the native instinct.

While the grammatical system of the Greeks falling under the control of philosophy spent itself in the effort to discover from language the relation of word and idea, sentence and judgment, speech and thought, the Hindu grammar dealing with severer and more definite matters of objective fact proceeded to the accurate observation of the sounds and their effect upon each other in combination, and so developed a scientific phonology; analyzed the word forms, recognizing root and suffix and ending, and thus opened the way for a history of words regulated by other than subjective tests; classified and summarized on the basis of accurate statistical observation the mechanism of the language, and laid thus the foundations for study of the regulative principles in the life of the language.

In the latter part of the 18th century the Sanskrit language and with it the Hindu system of grammar were brought to the attention of European scholars, and made available for their study through the labors primarily of Sir William Jones (1746-94) and Henry T. Colebrooke (1765-1837), the founders of the modern Sanskrit philology. In its effect upon the study of language this was the discovery of a new world. On the one hand the recognition that Sanskrit was akin to the European languages immediately gave form and purpose

to the wide-ranging and desultory comparisons of similar words, or words of like meaning in different and widely separated languages, such as are represented in the great dictionary compiled at the instance of Catharine II. of Russia, 'Linguarum totius orbis vocabularia comparativa' (4 vols., Saint Petersburg, 1790-1); and Adelung's 'Mithridates' (4 vols., Berlin, 1806-17). The spread of Christianity, the translation of the Bible into many languages, and the increase of intercommunication had called attention to the diversities and similarities of human speech in a way before unknown, and quickened anew the old queryings regarding the origin of language. The minds of men and the materials were preparing for a comparative science of language; there was lacking, however, the point of approach and the thread for the labyrinth, without which there could be no science. The discovery of the kinship of Sanskrit with the European languages yielded the way of approach through the establishment of a family of cognate languages conceived as derived from one common parent language no longer existing. The discovery of the Hindu system of grammar, throughout which was latent the notion of historical development with reference both to sounds and structure, provided the thread and the method by which a historical grammar could be developed. Out of a comparative grammar that is historical in motive and procedure has arisen the modern science of language.

This modern science of language demands therefore a stricter definition than the one offered at the beginning of this article. It is the science which deals with the life conditions of human speech as it historically adapts itself to use in the communication of thought. The conformableness of speech-facts to general conditions of life and growth dominating the entire material of a language makes it possible for language-study to take the form of a science. The science of language is a science, in that it seeks to arrange the phenomena of change in the development of its material and give them order according to these general life-conditions and principles of being.

The modern science of language begins with Franz Bopp, born in 1791 in Mainz, and professor in the University of Berlin from 1821 to his death in 1867. His first work, 'Ueber das Conjugationssystem der Sanskritsprache in Vergleichung mit jenem der griechischen, lateinischen, persischen, und germanischen Sprache,' Frankfurt, 1816, laid the first scientific foundations for the application of a comparative method to language study, in that it gave systematic demonstration of what had been already suggested by Sir William Jones (letter of 1786) and Friedrich Schlegel, 'Sprache und Weisheit der Inder' (1808), namely that the Indo-European languages possess their similarities in words and inflexions by virtue of descent from a common stock. His chief attention in this as in his later and chief work, 'Vergleichende Grammatik des Sanskrit, Send, etc.,' Berlin 1833-52, was centred upon the determination of the original significance of the various inflexional elements, tense signs, personal endings, etc., these being presumed to carry each a distinct meaning in the supposed agglutinative

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structure of the word. Though this purpose is now known to be much farther from fulfilment than Bopp in his time believed already attained, his demonstration of a comparative method, used by him merely as a means to an end, is recognized as a great and permanent enrichment of science, indeed as the inauguration of a new science.

While Bopp's work was to such an inordinate extent absorbed in the application of his comparative method as to neglect the processes of development in the individual language, Jacob Grimm (1785-1863) was giving the first exemplification of the historical treatment of a language in his 'Deutsche Grammatik' (1819-37).

The general or philosophical science of language dealing with principles of structure and relations to thought had its beginning with W. von Humboldt (1767-1835) and was most notably developed by Heymann Steinthal (1823-99), whose chief works in this field are: 'Der Ursprung der Sprache' (1851; 4th edition, 1888), and 'Charakteristik der hauptsächlichsten Typen des Sprachbaues' (1860).

August Fr. Pott (1802-87) supplemented the comparative work of Bopp by leading toward an exacter phonology in the course of his search for correct etymologies; chief work: 'Etymologische Forschungen' (1833-6, 2d ed. 1859-76). August Schleicher (1821-68) in the conviction that the science of language belonged among the physical sciences effected a powerful influence upon the development of the discipline by organizing its material under the semblance of an exact science; chief work: 'Compendium der vergleichenden Grammatik' (1861-62; 4th ed., 1876). Herewith the list of the pioneers is complete, unless there be added the name of Berthold Delbrück (born 1842), who though of a later generation of scholars, opened the field of comparative syntax ('Syntaktische Forschungen,' 1871-88, and 'Vergleichende Syntax,' 1893-1900).

With the last quarter of the 19th century the science passing into the second half-century of its established existence took on more settled and organized form, and assumed a sterner air. The processes and results of the argonaut days of prospecting and placer mining had appealed much to the popular imagination, especially when presented in the attractive and sometimes fantastically romantic style of Max Müller's popular writings, 'Lectures on the Science of Language' (1861-4; 2d ed., 1891); 'Chips from a German Workshop' (1868-75; 2d ed., 1880); or even in the clear, cool sanity of William D. Whitney's 'Language and the Study of Language' (1867), and 'Life and Growth of Language' (1875).

More detailed investigation and stricter adherence to scientific methods characteristic of the latter-day studies have undermined many of the certitudes of the earlier and appreciably removed the field of scientific interest from the immediate horizon of popular interest. The greater complexity of the problems in view of the greater abundance and complexity of the data and the abatement of assurance concerning great issues and fundamental questions induced by the closer observations of finer materials and the weighing of finer distinctions,

and finally the very magnitude of the material assembled for observation have tended to defeat perspective and render for the time difficult if not impracticable broad statements simple enough to fit a general interest and yet true to the facts as known. The newer science, really the science proper, has therefore received no such popular interpretations as the older and simpler science received at the hands of Müller, Whitney, Sayce, and others. In passing to the years of discretion this science like others has exchanged poetry for prose.

The distinctive features of the newer science are: (1) It exacts a more detailed mastery of the phenomena of the individual language; (2) it becomes in consequence less comparative, and more historical; (3) it is more concerned with life-processes than with origins; (4) it receives its stimulus more from observation of living languages in the spoken form than, as was the case with the older science, from the record of ancient languages in the written form; (5) it occupies itself with finer determinations, and conceives of the parent stock, whatever family of languages or dialects it may be considering, as possessing more complexity of detail; (6) it is guided more strictly by consideration of fixed habits inhering in the life-conditions of the language under investigation as a whole and by methods of treatment and of judgment inferred from the life conditions of language in general.

A series of brilliant discoveries gave the impetus to the new departure: (1) 'Verner's law,' made public in 1875 by Karl Verner, who proved that certain exceptions to the action of 'Grimm's law' of consonantal mutation were due to original differences of accentuation in the Indo-European parent-speech; (2) Karl Brugmann's demonstration (1876) through the postulation of a 'nasalis sonans' of an entire reorganization in the entire vowel-system of Indo-European; (3) the convincing proof brought independently by three scholars, Osthoff, Collitz, and Johannes Schmidt in 1878 and 1879 that the European vowel diversity of *e-o-a* was older than the uniform Sanskrit *a*. These discoveries brought order out of chaos in the whole Indo-European vowel system, and, what is of vastly greater importance in the development of the science, established confidence in the reign of law throughout the phenomena of speech. The task of uniting the results regarding the vowels into a system was effectively performed by F. de Saussure in his 'Système primitif des voyelles' (1879). The first plain assertion that phonetic laws operated uniformly coupled with an attempt to apply the principle in practice was made by Aug. Leskeen, a pupil of Schleicher, in his 'Declination im slavisch-litauischen und germanischen' (1876), and a first formulation of the new methods of procedure, was made in Osthoff-Brugmann's 'Morphologische Untersuchungen' (Vol. I., 1878). Hermann Paul's superb 'Principien der Sprachgeschichte' (1880; English translation, 1882) set forth the life-conditions of languages as viewed by the new science, and finally at the end of the century Brugmann and Delbrück's 'Grundriss der vergleichenden Grammatik der Indogermanischen Sprachen' (1886-1900), collected the whole body of results in phonology.

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inflection, and syntax into an organized statement of what modern science has determined regarding the life-history of the Indo-European tongues.

From the beginning it had been under the leadership of the Indo-European grammar that the science was created, and this leadership has persisted, though with diminishing emphasis, into the later developments. The treatment of other bodies of language and the methods and standards of research in connection with them have been in general shapen on the models set in Indo-European grammar. The tendency has been increasingly strong in recent years toward concentration of study upon narrower groups of languages or dialects, and few have been able to extend the range of their scientific judgment over languages of various type and affinity. Works dealing therefore with human speech as a whole have become of rare appearance. Such a work, however, is H. von der Gabelentz's *'Die Sprachwissenschaft'* (1891), and such are the works of Heinrich Winkler, *'Zur Sprachgeschichte'* (1887), and *'Weiteres zur Sprachgeschichte'* (1889). The only attempt to give an account of all the languages of the world is represented in Friedrich Müller's *'Grundriss der Sprachwissenschaft'* (3 vols., Vienna, 1876-88). While all these books are rich in suggestions of possible points of view in the treatment of individual languages, they certainly make it apparent that the science is not yet ripe for the large generalizations demanded in this broader field. The science of language unfortunately still remains essentially a science of the Indo-European languages. Until, however, other families of speech have been brought under complete scientific treatment and yielded their results for fuller illumination of the processes involved in the history of Indo-European languages many of the fundamental general questions involved therein must await their settlement; such are, for example, the problem of grammatical gender, questions of origins connected with the moods, tenses, cases, and their inflexions, theories of compounds, significance and delimitations of the parts of speech, significance and historical relation of various types of structure, such as the inflexional, agglutinative, isolating, etc.

Despite the attempts of Schleicher and others to make the science of language rank as a natural science, it is now generally recognized that its place is among the historico-social sciences. Its uniformities or laws are social laws. The individual receives his language in the form he does and reproduces it as he does not because of the physical constitution of his environment nor because of the physiological constitution of his apparatus of hearing, or of his organs of speech, but because he is thrown into social communication with other individuals using the language in question. A child born deaf will be in consequence dumb. A language is not what it is by virtue of climate or other environment, but by virtue of its persistence in a given society as an organ of communication. Its departure from the norm and differentiation into a separate dialect or language will be conditioned by a lessening or cessation of communication and the consequent creation of a new social community. On the other hand

a child of any race and any human physiological structure, if brought up from infancy in an alien speech community will acquire accurately and without accent the speech of that community. The negro brogue of the United States, for example, is in no wise due in the individual case to the thick lips or spreading nose of the negro, but has been acquired from other negroes who had received it through a line of succession and ultimately from the first negroes who had imperfectly (and imperfectly by reason of the persistence of their own original language-type) imitated that dialect of English commonly spoken in the South. This brogue, so far as it is distinguished from the English of the Southern whites, stands to represent the lines of social connection among the negroes, and not to represent a physiological distinction. A negro child reared from infancy in exclusive association with Maine farmers would speak a pure New England dialect without trace of negro brogue, but his lips would remain just as thick.

The uniformities in the historical development of a language with which the linguistic naturalists have associated the conception of natural law, particularly for our present purpose the uniformities of sound-change, operate on two axes: (1) The same changes show themselves in the language of every individual in the speech community; (2) the same changes show themselves in every word where the sound occurs throughout the whole mass of the individual's language. The first of these uniformities is unquestionably a matter of social conformity based upon the necessity of intelligibility in communication and the instinct of imitation whereby the individual continually adjusts himself to society. Language as a spoken fact is always an individual possession. In last analysis there is no (spoken) English language, but only the many languages of English-speaking individuals; but all these languages in the processes of intercommunication are continually tending toward uniformity through the effort of hearing so as to understand and speaking so as to be understood in perpetual correction of those centrifugal tendencies of individual speech which, with slackening intercommunication toward this side or that start the line of cleavage for dialectal divergence.

The uniformities of the second class, namely those involved in the spread of a given phenomenon throughout the entire vocabulary of the individual's language, constitute the chief marvel of language-life and present a problem whose solution must reach into the most fundamental principles of the psychology and history of speech. If Old English "sc" becomes English "sh" in "ships" from "scip," why should it also in "fish" from "fisc," and in "dish" from "disc," and in "bishop" from "biscop," etc.? What form of collusion can there have been between the words? So far as we can observe from living speech, changes of pronunciation come up in individual usage, one word at a time. Generally these individual new pronunciations or mispronunciations arise from imitation of a single word in another's pronunciation. We are speaking here only of unconscious imitation, and not of course of the pronunciation overtly and consciously acquired from dictionary or teacher. The new pronunciation and the old-

exist for a time side by side, both rising often into consciousness together when the word is uttered. The marvel is that these dual images attach to the sound-picture as it resides in the storehouse of memory below the level of consciousness, and that they tend to appear whenever and whenever this sound-picture is summoned into use. The ultimate choice between the new or the old depends upon influences which determine a preference like the influences of association which determine the choice of manners, gestures, colors, expressions, etc. The new pronunciation is a new word and comes in as a social fad, but the linking of the new sound to the old it replaces drags into the horizon of the new fashion every other occurrence of the same old sound. So the shift, if it establishes itself at all, makes its way resistlessly through the vocabulary. This is the character in which law appears in language. It is evidently not law in the sense of the law which governs a chemical reaction, but rather in the sense of psychological law which carries an unconscious mannerism throughout all the opportunities for its occurrence in individual behavior, or of social law which spreads unconscious molds of opinion, fashions of manner, thought, or expression throughout a community bound together in intimate social exchange.

Language itself may be defined as the communication of thought by speech-sounds. These sounds, generally in combination, but sometimes even singly (cf. "sh!" meaning "keep still"), carry signification, that is, suggest concepts and ideas in the minds of hearers. They do not do this immediately and directly by virtue of their character as sounds, but only mediately through their conventional association with the ideas they indicate. Some words naming sounds or actions and things producing sounds, like boom, fizz, hiss, splash, do maintain more or less consciously a partial connection between sound and concept, but even here convention plays a larger part than nature, that is, the word suggests its meaning to the hearer through his memory of its traditional use in speech, rather than through his recognition of it as sound in nature. That certain words show a degree of connection between sound and sense involves no conclusive proof that their origin was onomatopoeic. They may have been secondarily modified into likeness to certain sounds; such is, for example, apparently the case with clang, clank, clink. To the extent in which this is true such words escape the action of the ordinary laws of sound and are partial new creations. The interjections in a similar way are chiefly traditional, but there is always open the possibility of modification or new creation whereby the sound is the direct product of reflex-action. The combination of these two processes, imitation and reflex-action, represents presumably the persistence in language of the creative processes which first gave it existence. We have indeed no other way of estimating concerning the origin of language than through observation of these creative processes as they still maintain vitality. Language cannot, however, be said to have issued from these processes and become language until it has shaken itself free from its connection with what we may call nature and established speaking and

hearing upon the basis of reproduction. Until it has thus shaken itself free, it is a manifestation of the individual, rather than an instrument and a monument of society.

The feeling, however, that name and thing are naturally and inseparably joined is a persistent and fundamental factor of the folk-consciousness concerning language. It is this feeling which determines the notion common among uncivilized peoples that knowledge of the name imparts power over the thing. It manifests itself in the naive impression that a foreign tongue is a weird perversion of the only real speech, that is, one's own, and that its words and names may be understood and interpreted as modifications of those in one's own language. Herein lies a pregnant source of the folk-etymologies applied to foreign words or to new words of any origin. They are interpreted in terms of the known and in the naive belief that things "are rightly so called"; thus Rothschild pronounced as if compounded of child, asphalt called ashfelt, frontispice (Lat., *spicere*) spelled piece. Name and idea, outward form and inner content, belong naturally together and are inseparable; this is the unformulated conviction of innocence, before it partakes of the fruit of the tree of grammatical knowledge. The pressure is therefore constantly on to give like content, like expression, and like modification of idea like modification of form. Sometimes it is the content which yields to the pressure, sometimes the form; it matters little which, so long as the two are brought together. It is a case of yielding on the part of the content, when miniature, a derivative of *minium*, "red lead," comes to involve the suggestion of smallness through influence of *minimus*, or when duel (O. Lat. *duellum*, "battle") takes on the special meaning of a contest between two through the contaminating influence of duo. These illustrations represent a movement incessantly at work in language reshaping the meaning of words. It is, on the other hand, a case of yielding on the part of form when femel changes to female in order to make itself a proper consort for male, or when book, plur. beek (cf. foot: feet) becomes book, plur. books in conformity with hook: hooks; hat: hats, etc. Here belong all the multiform phenomena of analogy.

Words are not therefore dead symbols for concrete, definite unvarying things as ♀ is the sign of Aries, or ⊥ the sign for a right angle; they are instinct with the life of the ideas of which they are the replicas, of which they are the heard and spoken form. They absorb the character of the idea into themselves, and have good and bad repute, are coarse and vulgar, or fine and noble; and all this comes not from their sounds, or from anything inherent in their external form, but solely from their inner selves, their content of idea, their associations in use. Words that were once in good odor, and so far as their sounds are concerned can measure with the best, are now avoided as unworthy of entrance into decent society because of the taint of "evil communications." Others have risen in the social scale, cf. Greenough-Kittredge, 'Words and Their Ways in English Speech,' chapters xx. and xxi.

It is by reason of this identification with the life and character of their content that words

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are able to shift their meanings as they do. Solon is not only a definite tag of a particular man; it takes of the character and characteristics of the man, and therefore a Solon may mean a sage; so a vandal is a destroyer; cf. street arab, an Adonis, mecca, goal; paper was originally a papyrus product only; picture meant originally only a painting.

A word becomes sometimes habituated to association with one characteristic, one use, or one feature of an object or to one phase of an idea and so narrows or specializes its signification; as, minister, formerly meaning "attendant," meat, once "food," now one form of food, deer, once "animal" (cf. Germ. *thier*).

Syntax is that department of the science of language which deals with the sentence and the relations existing between the parts of which it is organized. Human speech is distinguished from the language of animals by the possession of the sentence. The sentence is a device whereby two names are brought into relation or comparison, one naming the subject of remark, the other the thought concerning it, or some other identifying attitude, action, or condition thereof. The device makes it possible to report or make a statement regarding something not immediately present within the field of observation of speaker and hearer. Two points determine a line, and the advance from the speech status represented in the single-name exclamation to that represented in the two-name sentence represents a difference as great as that in mathematics between a point and a line. The dualism of the sentence-type appears to have arisen by differentiation out of the single exclamation, which embodied in itself the name of a subject of thought and by aid of tone, gesture, attitude, general environment some indication of the thought concerning it. The cry, Fire! is a rudimentary sentence; it is subject and predicate in one; "fire burns," "fire is afire." The newsboy's cry extra! means "extra is for sale" or "extra is here"; in any case it suggests some sort of a predicate, and is also a rudimentary sentence. The warning cries of animals need not be conceived of as essentially different. The so-called impersonal verbs like Latin *pluit*, "it rains," are sentences in which the subject is not yet differentiated from the predicate. The subject is not to be "understood." If we are asked, "what rains," we can only answer "rain rains."

The two names by union of which the sentence exists are called subject and verb. The subject is the framework on which the phenomenon expressed by the verb is exhibited. The verb names a phenomenon temporarily exhibited in the subject. In the sentence, The sun shines, the verb is the name of an activity called shining; it is for the time being displayed in the case of the sun; another time it may be the moon.

The flexibility of the sentence as a device for discussing things without pointing at them is enormously enhanced by the development of other parts of speech which, assembled about the subject-noun and the verb, aid in making clearer that to which they are intended by the speaker to refer. The pronouns represent one of the most serviceable inventions of language. They serve to indicate objects without naming them. They act as proxies for nouns, and, in-

dicating in terms of context or situation as it develops, greatly increase the flexibility and usefulness of language.

A language tends to break up into dialects when intercommunication slackens throughout the mass of those who speak it, and in time, with cessation of intercommunication these dialects will become separate languages; thus Teutonic speech developed dialects in Germany, but the complete isolation of Norway and Sweden and the Danish peninsula developed a separate body of languages. Before the 15th century Latin served generally as the literary language or medium of higher intercourse for Germany as a whole, but with the Reformation and the invention of printing a form of German (the Meissen court language) based ultimately upon one of the dialects (East Frankish) came to assert itself as the centralizing medium. In general such centralizing languages are leveling planes raised above the inequalities of surface represented by the dialects, though often they cut off the higher peaks to fill up the deeper valleys. These literary or standard languages represent the leveling influences of intercourse. All the European languages unless held in check by chauvinistic violence tend to approximate each other by interchange of loan-words and gradual acceptance of common syntactical molds. This is the route toward a common international language, which in time would establish itself as representative of international intercourse and civilization. It is essentially the same route as that by which in narrower ranges languages of subject peoples have been displaced by those of their conquerors, as Gallic by Latin, or those of the conquerors absorbed by those of the conquered, as Norman French by English. The resultant tongue in such cases is really a mixture of the two. The Romanic languages are generally spoken of simply as descendants of the Latin, but their divergence from each other in phonology and syntax is largely incited by the languages the Latin seemed to displace; cf. Wechssler, 'Giebt es Lautgesetze?' (1900). The English language by its acceptance of loan-material from many sources and simplification of its inflexions and syntactical structure has long been preparing itself, though unconsciously, for use as a world language. Its orthography is now its sorest hindrance. The slow processes, however, of natural adaptation and approximation do not move rapidly enough for the demands of the day. There is undoubtedly a positive demand for a medium of commercial intercourse between the peoples and this demand has called forth no less than 55 attempts within the last two or three centuries at the artificial construction of an international auxiliary language; cf. Couturat-Leau, 'Histoire de la langue universelle' (1903). Of these the largest practical success has been achieved by the Volapük of Pastor Schleyer (1880), which in 1889 is said to have been more or less completely acquired by a million disciples. Since then, however, it fortunes have been in decline, and a new and somewhat more rational system devised by the Russian physician, Dr. Zamenhof, and called Esperanto, has forced itself to attention. The basis for the construction of such a language would seem to be, if we accept the guidance of language in its natural develop-

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ment: (1) the selection of a vocabulary made up as far as possible of words in international or cosmopolitan use; (2) the acceptance of the analytic rather than the synthetic and inflexional structure of the sentence, that is, a simplified English syntax; (3) and a simple phonetic spelling.

Language is primarily a matter of sounds, and not of writing. The first records by writing were indeed records of things, that is, pictures, rather than records of language. Words had not yet been differentiated from the things they denoted and given objective existence. The transition to language-writing seems to have taken its rise when the value of a picture, that is, ideogram, is extended to include homonyms; thus, as if the ideogram of mail (armor) were used to denote also mail (post) and male. Then next the symbol becomes associated with a syllable, and finally by use of vowel signs (cf. the Hebrew vowel points) the various syllables of like consonants are differentiated and the symbol becomes the sign for a sound. In these modern days of much reading the written form has come to exert in various ways a considerable influence upon the spoken language. Words are often pronounced as they are spelled; thus the *l* is often pronounced in *yolk*, *almonds*, *falcon*; the *t* and *y* are separately rendered in *don't* you, though not in *orchard* for *ort-yard*. Written abbreviations become words, like *exam*, *gym* (gymnasium), *coop* (coöperative store), *C. O. D.*, pronounced *seedéed*, and used as a verb with a participle *seedéed*.

Orthography as a conventionalized form of writing has the advantage of rising above the irregularities of dialect and the historical changes of sounds, and binding together the forces and expressions of a civilization in defiance of time on the one hand and of space as expressed in provincial boundaries and dialect, on the other.

Languages may be classified on the basis of historical connection, as the Semitic family, the Ugrian, the Indo-European, etc., or on the basis of resemblance in structure. The latter classification is but rough and approximate at its best, and involves no assurance or assumption of historical connection. It is remarkable, however, that languages of similar structure, though apparently without genealogical connection, are often associated geographically. Thus Central Asia exhibits many languages of what we call agglutinative structure; so Central Africa, Southeastern Asia favors the isolating type. American languages of different families, that is, totally unconnected historically, resemble each other in the use of the "incorporating" structure. The classification by structure is based upon the preference shown by a given language for a certain mechanism or device, not upon the exclusive use thereof. We can thus illustrate from English in individual occurrences all the different prevailing types. Isolating languages express thought by successions of independent words, whose grammatical relations are betrayed by the context and the relative position aided occasionally by particles. Chinese is an illustration. An English expression like "You find John a six-foot stick" is thoroughly "isolating" in character, as much so as any Chinese sentence. The isolating type represents the highest economy of material and is the creation

of a compact order of society whose stable conditions rest upon fully recognized conventions.

Agglutinative languages are characterized by words whose grammatical relations are betrayed by prefixes, suffixes, or infixes, these elements being so loosely combined with the word that their separate value is clearly felt. Eng. *un-fail-ing-ly* and *talk-a-tive-ness* are agglutinative. This type of structure is the most "regular," leaving least to convention, and is best suited to the use of tribes scattered over wide areas, who are obliged, however, to maintain some communication with each other.

Inflexional languages indicate grammatical relations preferably through elements which are so intimately combined with the word-body as to have no distinct meaning identified with them in the consciousness of the speaker. The Indo-European and Semitic languages are inflexional. The incorporating languages tend to treat the sentence as a single word by forcing the verb to cover and include the whole proposition.

Consult: Sayce, 'Principles of Comparative Philology' (4th ed., 1893); Delbrück, 'Introduction to the Study of Language' (2d ed., 1885); Sweet, 'The Hist. of Language' (1900); Oertel, 'Lectures on the Study of Language' (1901); Giles, 'Manual of Comparative Philology' (2d ed., 1901).

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Sciences, Classification of. The effort to classify systematically the manifoldness of scientific achievements is a part of the methodology of science, and thus ultimately a part of logic. It has attracted the philosophical thinkers from the days of Plato to the present time. It came to the foreground of logical thought especially at those epochs in which new scientific movements started. It was thus mostly much more than a mere dividing and subdividing of the really existing sciences. It was essentially an endeavor to open new perspectives and to show the way to new possibilities of development. The new ordering and grouping of the parts of knowledge was thus always a symptom of great philosophical movements and an expression of deepest energies in productive ages. Only those periods whose scientific thought was lost in specialization without originality neglected the logical task of working out a survey of the whole field.

The principles of classification have changed frequently, and it would be almost artificial to seek a direct continuity in the successive efforts. Essentially psychological are those classifications with which both the classical philosophy and the modern philosophy answer the problem for the first time, inasmuch as both Plato and Bacon group human knowledge in relation to mental faculties. When the Platonists divided all knowledge into dialectics, physics, and ethics, the three large parts corresponded to the activity of the reason, to the sensory perception, and, thirdly, the desires and impulses. Bacon, also, comes to a three-fold division of human learning, corresponding again to three mental regions. It is memory, imagination, and reason which are responsible for the subdivision of the "intellectual globe." The memory gives us history; imagination

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gives us poetry; and reason furnishes us with philosophy or the sciences. History is divided into Natural History, with its subdivisions of Normal, Abnormal, and Artificial Phenomena; and Civil History, with its subdivisions of Political, Literary, and Ecclesiastical History. Poetry is to be divided into Parabolic, Dramatic, and Narrative. Philosophy or the sciences, finally, refer first to Man, secondly to Nature, thirdly to God. The Science of Man is subdivided into Civil Philosophy, with its departments of Intercourse, Business, and Government; and on the other side, Philosophy of Humanity, which refers either to the Body, with Medicine, Athletics, etc., or to the Soul with Logic and Ethics. The Science of Nature is Speculative, and as such either Physics or Metaphysics; or it is Applied, and as such either Mechanics or Magic.

This classification of Bacon remained a classic model for more than a century. The French Encyclopædists still stood completely under his influence, and d'Alembert substituted only art in general for poetry, thus continuing the intellectualistic attitude, according to which poetry and art are defined as technical means of communication and expression and thus as parts of the system of knowledge. Yet the one-sidedness of every psychological classification was always felt, especially because there is no knowledge which originates from one group of mental functions only. It thus seemed a natural antithesis to refer the sciences not to their mental origin but to the mental purposes which are to be fulfilled by them. It can be said that such a reference to purpose controls the classification of Aristotle. He combines the Dialectics and Physics of the Platonists into the one group of Sciences with theoretical purpose. A second group is then formed by the Sciences which refer to practical ends of action. And the third group, finally, are the Sciences related to creative activity. The Theoretical Sciences are divided into Analytic, Metaphysics, and Physics; the Practical Sciences into Ethics and Politics; the Creative Sciences into Art and Technics. In a similar way, Locke, too, adjusts the divisions of knowledge to three groups of purposes. The first end of Knowledge is a theoretical understanding; the second purpose is the good and the useful; and the third is the development of Science in the interest of the understanding. He comes thus to the separation of Physics, Ethics, and Logic, in defining Logic as a nominalistic science.

The progress of natural science, with its important efforts of classification in descriptive botany and zoölogy suggested in the meantime more and more a classification of all knowledge with reference to the various groups of objects. Of course, in the subdivision such grouping with reference to the various things in the universe had always been acknowledged; but complete systems of classification of this type were now worked out from various sides. Both the physicist Ampère and sociologist Bentham, for instance, start thus from the difference of physical and mental phenomena, the one dividing all sciences into Cosmology and Noölogy, the other into Somatology and Pneumatology. Their further classifications elab-

orate a complex system in which partly theoretical, partly practical, principles are influential. Their fundamental division corresponds in a certain way to the two large classes with which in our present time the unphilosophical efforts of popular science are usually satisfied. Popular sciences prefer, indeed, today mostly to group all knowledge with reference to the material and, accordingly, to work with a classification which begins with a separation of physical and mental facts. The physical facts are then subdivided with reference to the different classes of objects and the mental facts of the individual and of society with regard to the different groups of mental interests.

Yet the classification with reference to mental faculties, practical purposes, or groups of material, are not the only ones which have become influential in the development of thought. Even a naturalistic age could not overlook the fact that, after all, the different sciences do not really deal with different objects, but more often with different aspects of the same object. Man himself, for instance, can play a rôle in a large variety of sciences which do not belong together at all. These various aspects which interest the different sciences are, however, not simply coördinated; otherwise they would be unfit to constitute a systematic order. Comte recognized that they were dependent upon each other, and thus he created a system in which the fundamental sciences were conceived in one straight line of logical order. If each member of the series really demands the foregoing as its presupposition, it is a necessary consequence to see with Comte in this logical order at the same time the historical order of the sciences. The latest and most complex group of knowledge is that which he called Sociology, which contains practically all the knowledge of history and civilization, all the mental and moral facts as far as they enter into a system of positive knowledge at all. But this whole social life presupposes the understanding of man as an organism. The science of sociology is thus dependent upon the science of biology. But the biologist, again, tries to bring back his facts to the laws of chemistry, which he presupposes, and so forth. The one-dimensional system of Comte thus begins logically with a most general type, with Mathematics, and goes from that to astronomy, from that to physics, then to chemistry, then to biology, and finally to sociology. Spencer's system is essentially an elaboration of Comte's. He, too, begins with the most abstract science, mathematics; progress is then to the abstract concrete sciences which deal with the general forces of the universe, mechanics, physics, and chemistry, for which mathematics is the presupposition, and thence to the concrete sciences which refer to single objects; that is, to astronomy, geology, and biology, while psychology and sociology become special parts of biology. The shortcomings of all these efforts are evident as soon as we consider that such positivistic systems crowd the totality of mental and moral sciences and all that refers to history and civilization under the conception of sociology. That means, of course, a strictly naturalistic aspect of the history of culture. All that the inner civilization of mankind has produced,

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politics and law, literature and art, knowledge and religion and philosophy, become then nothing but functions of the biological organism; and yet everyone who takes the standpoint of the historian or jurist, of the philosopher or theologian, feels the artificiality of such a naturalistic standpoint for these disciplines. The principle of grouping the sciences with reference to their logical relation is, however, in itself, of course, not responsible for this artificiality and for this unfairness to the historical and cultural disciplines. It was the materialistic metaphysics of those positivistic systems which brought about this overweight of natural science. On idealistic ground the reference to logical relations yielded accordingly a system of very different type. In Hegel's philosophical system, for instance, the sciences are brought, too, into logical relations with fullest justice to the demands of the moral sciences.

But while the Hegelian system has lost its influence in our day through its speculative character, our time is, in its deeper thought, strongly influenced by newer movements which again bring order into the intellectual globe by insisting on logical differences which had been neglected too long a time. This movement, starting with Windelband, considers as the most essential difference between the various special sciences whether the logical aim is to find laws or to understand the individual objects. When Spencer separates those more abstract sciences of the physical and chemical energies from the sciences of the concrete individual object, it is for him a matter of course that these sciences of individual objects have to overcome the concrete individuality and have to find general laws which hold for all the concrete objects of that special group. This newer school, on the other hand, insists that there are sciences which on principle do not want to find laws and are not interested in generalities, but seek to understand and to interpret the concrete objects just in their individuality. All the historical sciences then belong to this group as against the natural sciences which seek the abstract laws. It is evident that this division has again nothing to do with the separation of the different kinds of objects, as any kind of material may be considered from both standpoints. Any process may be on the one side considered as a special case of a general law, interesting thus only in so far as it allows the recognition of any law in it, and, on the other hand, it may be considered in its incommensurable individuality. As a matter of course from such a logical standpoint mental life, too, allows both ways of consideration, and enters thus on the one side, into the law-seeking naturalistic sciences, on the other side, into the historical sciences which seek the unique individuality. Psychology would be the natural science of the mental phenomena.

It can be said that these various motives which have alternated in the classification of science are all still influential today, partly as after effects of historical movements like those of Comte and Spencer or Fichte and Hegel, partly as results of conditions which ever again repeat themselves. Especially the

different emphasis on different sciences must lead always anew to different methods of grouping. The philosopher, the physicist, the historian, the psychologist insist instinctively on different schemes of classification, the one perhaps influenced by the manifoldness of material, the other by the manifoldness of method or by the variety of purpose; the one anxious to draw sharp demarcation lines between the different fields and thus taking care for an exact logical relation, the other much more anxious to express and to favor in his system the manifoldness of interrelations between the various parts of human knowledge and science. It is thus hardly possible to sketch a classification of sciences which would find general agreement and which would be in principle independent of a particular philosophical standpoint. Yet it may be possible to characterize at least certain chief tendencies which can be recognized in the scientific life of our time and which express themselves in the practical division of scientific labor, for instance, in the organization of the higher institutions of learning.

The largest division of knowledge may be that which separates the Theoretical Sciences and the Practical Sciences. It cannot be denied that even this separation offers logical problems. On the one side it has been said that the so-called Practical Sciences also, for instance, those of the engineer or of the physician, of the lawyer or of the minister, of the diplomat or of the teacher, are after all theoretical as far as their really scientific content is concerned, while that element in them which makes them practical is an art and not knowledge. The skill in diagnosing disease or teaching pedagogically, or presenting legal argument, can be imparted by training but cannot be communicated in judgments, while every science must be a system of judgments. The juristic or theological or technological science, on the other side, seems just as theoretical as history or mathematics. While in this way the knowledge element of the practical sciences would go over into the sphere of the Theoretical Sciences, others have taken the opposite view and have claimed that there is no knowledge but practical knowledge. It is a philosophic doctrine which became popular partly in the sphere of biological thinkers, partly among radical empiricists. They all agree that knowledge is a function of the human organisms which became developed through the practical needs of life. Every science, including all the so-called theoretical ones, thus exist only by their fulfilling certain practical needs of men.

But even if we accept the arguments on both sides, that fundamental division of Theoretical and Practical Sciences remains justified. The question whether all knowledge serves ultimately practical ends and has its meaning in this relation to practical purposes is an epistemological one; the separation between theoretical and practical sciences, for instance, between physics and engineering, between biology and medicine, is a methodological one. The arguments thus move on different levels. In a philosophical sense every science may be practical; in a logical sense astronomy is

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strictly theoretical, while the science of bridge-building is not. It is again such logical argument by which we must reject the opinion that all Practical Sciences are ultimately theoretical. Of course, if we were to call theoretical every group of propositions which can be communicated and learned, the science of bridge-building would be just as theoretical as geometry. But the logician has the duty to discriminate between those sciences which consider the facts as such without any relation to our own practical purposes and those other sciences in which the whole grouping of facts, the sifting and combining of the material, is controlled by a practical human end. Medical science is certainly made up of statements which would find their place in a complete theoretical system of the physical world. But in such a concrete description of the processes in the universe the pathological variations of the human organism would play a most insignificant rôle, and a knowledge of the chemical substances which bring harmony again into the organism would be accidental. In the Practical Science of medicine such curing of the diseases becomes a centre of the thought system, and the selection of theoretical facts which are to enter into this science is completely determined by this practical end.

It is thus not even sufficient to characterize the Practical Sciences as applied sciences. The latter expression suggests that the logical difference between the theoretical and practical disciplines is given merely by the fact that the one considers a certain relation theoretically and the other teaches how to apply it. Every Practical Science would thus correspond exactly to a special theoretical science. But the relation is a much more complex one, inasmuch as the Practical Science cannot logically be characterized by the relation to the theoretical starting point, but only by the relation to the practical end. The one end may demand the coöperation of a dozen sciences and one Theoretical Science may enter as a means into a dozen different Practical Sciences. We have to acknowledge thus for the Practical Sciences a unique and independent logical structure and the system of practical sciences would demand subdivisions which would not correspond at all to the subdivisions of theoretical knowledge. The chief human ends and aims would have to determine the grouping of these practical disciplines. We might separate thus, firstly, the Utilitarian Sciences; secondly, the Sciences of Social Regulation; and thirdly, the Sciences of Social Culture. In the Utilitarian Sciences the practical aim refers to the world of things; it may be the technical mastery of nature, or the treatment of the body, or the production, distribution, and consumption of the means of support. Here belong therefore also the disciplines which are studied in the institutes of technology and in the Medical schools, in the agricultural institutions, and so on. The Sciences of Social Regulation serve those aims which refer to the mutual relations of subjects; they deal with the political, legal, and social problems. The Sciences of Social Culture, finally, refer to those aims in which not the individual relations to things or to other subjects are in the foreground, but the purposes

of the development of the subject themselves; education, art, and religion here find their place.

On the other side we find, then, the universe of Theoretical Knowledge as it is studied in the collegiate departments and graduate schools of the universities. Inasmuch as the pure theoretical knowledge for Knowledge's sake made up the original meaning of the word Philosophy, the whole of it might be called Philosophical Sciences in the widest sense of the word. This tradition is still alive, for instance, in the German universities, where all Theoretical Sciences are classed together in the Philosophical Faculty as against the Faculties of Law, Medicine and Divinity; and in a corresponding way the American universities confer the Ph.D., that is, Doctor of Philosophy, on the student of mathematics or history, of languages or natural sciences. In the historical development of scientific work this unity of theoretical knowledge has been replaced by the most complex manifoldness of scholarly endeavors. One part of theoretical knowledge after the other was dismissed from philosophy as soon as it reached a certain independent importance, and yet philosophy in the narrower sense of the word remained in its traditional rôle of furnishing a theoretical view of the world. It was no longer identical with the totality of knowledge, but it fulfils the same purpose by bringing unity into the manifoldness of scattered special sciences, in examining their fundamental conceptions, their relative values, their methods, and the position of the whole of knowledge in the system of human purposes. We can divide, thus, the totality of Theoretical Sciences from the first into the special sciences on the one side and the unifying philosophy on the other.

If we abstract from philosophy, we have thus to subdivide further the specialistic sciences. It would be certainly unfair to the actual tendencies of the scientific life of our day if we accepted the scheme which was more or less modeled after the old positivistic samples. The work which our modern historians are doing, the work of the students of literature and language, of art and religion, is not done in the spirit of those who saw in it only special applications of natural laws and thus a sociological department of biology. However widely opinions may diverge as to the logic of historical thinking, the whole scientific work of our time is decidedly aware of a fundamental difference between the naturalistic and the historical attitude towards the world. We should thus have to divide the non-philosophical theoretical sciences into naturalistic and historical sciences. The historical sciences which aim towards a connected view of the one development of our human civilization might then be subdivided into political history, history of art, history of religion, history of language, history of economics, and so on.

The natural sciences, on the other hand, which start from the single objects only to find the general laws might well be subdivided with reference to their mutual dependence. We have, then, in mechanics the science of the most general relations of natural objects; and if mechanics represents the top of this pyramid of special sciences, the lower level would be

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represented by physics and chemistry, and the broad basis by astronomy, geology, mineralogy, botany, zoölogy, anthropology. There would remain uncertain the position of mathematics. In some and very important respects mathematics is a science which studies the formal relations of the natural objects and might thus well be grouped with mechanics. But at the same time mathematics has its fundamental relations to logic, and thus to philosophy. The elements of mathematical knowledge are not found, like the physical things, but are created by human thought, and their relations are valid for the universe because we cannot think the universe otherwise than through the categories of our thought. It must depend upon the emphasis which we lay on the one or the other side of the mathematical science whether we group it with philosophy or with the natural sciences.

We have further to acknowledge that the totality of sciences which are naturalistic in their logical structure cannot be grouped together into that one pyramid whose top is mechanics, because we have so far neglected the psychological sciences. Their general constitution corresponds indeed completely to the natural sciences and is thus also sharply to be separated from the historical sciences; but their material cannot be brought under the category of mechanical movement. The mental phenomena are certainly related to the physical brain process, but the meaning of psychology is destroyed if physiological processes are really substituted for mental facts. We have thus to consider the sciences of mental life as a special group of naturalistic science. The top of their pyramid would be general psychology, and its basis the special sociological sciences. While psychology is thus independent and not at all merely a part of biology, we have to acknowledge it as a special science, and thus to keep it separated from philosophy. That does not deny that by many traditional ties psychology is still nearly related to philosophy and it will remain so, inasmuch as its special work is more than that of other sciences dependent upon a critical philosophical examination of its fundamental conceptions.

Bibliography.—Bacon, 'De Augmentis Scientiarum'; D'Alembert, 'Encyclopedie, Discevers préliminaire'; A. Comte, 'Cours de Philosophie Positive'; Spencer, 'The Classification of the Sciences'; Wundt, 'Über die Einteilung der Wissenschaften'; Congress of Arts and Science, Universal Exposition, Saint Louis 1904, Vol. I.

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Sciences, National Academy of, an association incorporated by act of Congress, 3 March 1863, the object of which is to investigate, examine, experiment, and report upon any subject of science or art whenever called upon by any department of the Government; the actual expense of such investigations to be paid from appropriations which may be made for the purpose. The Academy holds a stated session each year at Washington, D. C., in April and another in Autumn at such places as may be determined. There are 96 members and 43 foreign associates.

Sciences, Normative, Normative sciences are systems of propositions whose contents are not facts, but norms; not experiences, but values; and whose teaching is therefore not that something is, but that something ought to be. There is thus a possible place for logic, ethics, and æsthetics, for philosophy of law and religion. Yet it would be meaningless to apply the term, normative sciences, to every kind of logic, ethics, and æsthetics. The term has gained its characteristic importance in immediate relation to certain definite philosophical presuppositions. The conception of norm is intended to mean more than an empirical prescription, more than a social agreement which binds the individual through merely social inducements; and also more than a merely biological necessity. A large variety of so-called philosophical enterprises has been at all times and is to-day satisfied with just such sociological or anthropological doctrines of ethical, æsthetic, and logical functions. There is indeed no logical difficulty in building up a system of ethics, for instance, which describes and explains how at different times and with different peoples different groups of actions became enforced through the organs of society. Biological sociology can easily show that a social organism can exist only when certain rules of behavior secure a social harmony. From the standpoint of such empirical philosophy, the moral conscience becomes an emotion which is artificially trained by the suggestions of education and the norm of action has no more value than any legal statute which is voted by a majority and reinforced by threatening the violators with punishment. From the same standpoint æsthetics describes and explains the various tastes which have been developed in the history of civilization by the silent agreement of the richest minds, their norms shading off into the changing prescriptions of fashion. Finally, in a similar way, logic becomes a description and explanation of those ways of thought which a certain period accepts as leading to such propositions as a particular society calls its truth.

In all these cases it is not meaningless to speak of an ought. Anyone who wants to agree with the demands of the community stands under a certain obligation to act, to feel, and to think in the prescribed way. He must subordinate his particular wishes to the general trend, otherwise he will appear immoral or tasteless or erratic. On the other hand, it is evident that the so-called norms cannot claim any other authority than as being the expression of the will of a number of individuals and as offering a certain appropriateness for the development of the social organism. Such sociological systems would themselves repudiate every idea of an absolute value for the ethical, æsthetic, and logical norms; the impossibility of such a claim would seem to them sufficiently proved by the fact that one nation or one period prescribes to the conscience actions which are forbidden at another time or by another nation. In the same way the history of art shows how the æsthetic standards were changing all the time, and the history of science demonstrates how the scientific theories were always only the expressions of certain tendencies, superseded constantly by new ideas. It would thus appear ab-

SCIENCES, PROGRESS OF—SCIENTIFIC SOCIETIES

surd to claim an eternal value for the norms of behavior, of art, and of science which chance to be influential with us to-day.

Those who believe in "Normative Sciences" do not contest the facts which are gathered in such sociological disciplines, and they do not underestimate their value. But they see in all such empirical accounts only contributions to the history of civilization and they believe that the conception of norms can be taken in a deeper sense, independent of the advanced prescriptions of a social organization. Norm means to them an absolute obligation, and only the consequences of the absolute values constitute for them a true Logic, Ethics, and Æsthetics. Those sociological doctrines then become merely empirical introductions to the true philosophical disciplines of valuable acting, feeling, and thinking. The norm is then sharply to be separated from anything which in principle changes like fashions and tastes or legal statutes. The norm is that which is absolutely valuable without any reference to any individual or to any social group of individuals, independent alike of the chance obedience which individuals offer to it and of the effects which may result from its application. That two times two is four, is a truth which is eternally valuable; that is, which remains valid without any reference to the question whether we understand it or not. No-one may think it truth, but everyone who wants to think, ought to think so, if he is to be acknowledged at all as a logical subject. It is of course meaningless to ask for the reasons or for the causes of such an absolute value. It is the ultimate foothold for our thought. Whatever we might offer as an explanation would have meaning only if we again called it a truth, and if we had to give account of what we mean by that, it could again be only the acknowledgment that it is that thought which we ought to think. It is a thought which we think without reference to our personal interests and without reference to any social demands but simply because we acknowledge an absolute duty to prefer this thought to its opposite.

Of course, there remains the possible objection that we can live our life without respecting such absolute duty; that we can think, for instance, without claiming more than relative value for our thoughts. We should thus be satisfied with the conviction that whatever we call truth may be found untrue by a future generation. But the philosophers of the normative sciences answer that this is an impossible standpoint. A knowledge which is not anchored in any absolute truth contradicts itself. If, for instance, the skeptical sociologist insists that there is no absolute truth, this at least is a judgment which he affirms with the conviction and with the understanding that it is itself a truth of absolute character, otherwise its meaning were lost. A consistent relativism, in short, destroys itself in the field of thought, and the acknowledgment of absolute norms is thus the indispensable presupposition for logic. A particular thought or a particular theory may, of course, be superseded; but the duty to think consistently and in accordance with logical axioms cannot be touched by the changes of civilization.

The same holds true for morality. The particular rules may change, but the meaning of

morality is lost if we do not give absolute value to the fulfilment of duty. It depends upon chance conditions, which contents become the duty of the man; but he is to do what his duty prescribes independent of his personal desires, ready to sacrifice himself for that which he acknowledges as his duty; that is a norm of absolute value. The normative ethics, just as the normative logic, thus are formal disciplines. But just their independence of any special content makes those logical and moral forms eternally valid. The same repeats itself finally in the field of art and religion where again the absolute form may be filled with the varying content which the history of civilization offers, but where the form alone gives eternal meaning to the ought which is involved.

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Sciences, Progress of. See ARCHAEOLOGY; ART; ASSYRIOLOGY; ASTROPHYSICS; ASTRONOMY; BOTANY; CHEMISTRY; ELECTRICITY, PROGRESS OF; EARTHQUAKES; GEOGRAPHY; GEOLOGY; LAW; MEDICINE; PHYSICS; RADIOACTIVITY; SCULPTURE; TELEGRAPHY; TELESCOPE; WIRELESS-TELEGRAPHY; ZOOLOGY, etc.

Scientific Alliance of New York, The, a society organized in 1891, the object of which is to promote co-operation among the constituent societies, the cultivation of popular interest, and particularly to procure a building in which all the societies shall be conveniently housed, and which shall become the scientific centre of the city. The council of the Alliance is composed of three delegates from each of eight scientific societies. The society has a membership of about 1,100.

Scientific Societies, organizations of scientists for the furthering of scientific study. They are largely devoted to the furthering of research work and the publishing of scientific journals, memoirs, etc.; and their meetings, which in the case of the larger societies are usually held at different places, promote discussion and intercourse among scientific students. The most important scientific societies of foreign nations are the Royal Society of London (founded 1660), the Royal Institution of Great Britain (1799), the French Academy of Sciences (1666), the Imperial Academy of Sciences, Russian (1725), and the Royal Academy of Sciences of Germany (1700), of Sweden (1739), and of Denmark (1743).

The American National Societies include the American Philosophical Society, founded 1743, the American Academy of Arts and Sciences (1780), the American Association for the Advancement of Science (1848), and the National Academy of Sciences (1863). In addition there are local academies or scientific societies in many states and cities. These often have a museum and scientific library, and hold meetings for scientific discussion. The oldest of these is the Connecticut Academy of Arts and Sciences at New Haven, founded in 1799; the Maryland Academy of Sciences dates from 1819; the California Academy of Sciences, in San Francisco, from 1853. In several of the States of the Middle West, Ohio, Indiana, Wisconsin, Iowa, Minnesota, Kansas, Nebraska, Colorado—there are academies that hold winter meetings, with programmes covering the different sciences. Among

SCILLA — SCINTILLATION

the prominent city institutions are the New York Academy of Sciences, founded 1817, the New York Scientific Alliance, the Philadelphia Academy of Natural Sciences, the Boston Scientific Society, the Boston Society of Natural History, and the Chicago Academy of Sciences. Other cities having scientific academies or societies are Salem, Worcester, Gloucester, and Williamstown, Mass.; Portland and Augusta, Maine; Hanover and Keene, N. H.; Brattleboro, Vt.; Providence, R. I.; Hartford, Meriden, New Britain, Middletown and Bristol, Conn.; Albany, Buffalo, Rochester, Binghamton and Poughkeepsie, N. Y.; Reading and Media, Pa.; Wilmington, Del.; New Orleans, La.; Saint Augustine, Fla.; University, Ala.; Chapel Hill, N. C.; Detroit, Mich.; Saint Louis, Mo.; Brookville, and Terre Haute, Ind.; Elgin, Peoria and Princeton, Ill.; Davenport and Muscatine, Iowa; Saint Paul, Minn., and Topeka, Kan.; Santiago and Santa Barbara, Cal., and Tacoma, Wash.

The work of these general societies has suffered from the specialization which the growth of modern science requires; the American Association for the Advancement of Science, the New York Academy of Science, and others of the larger organizations have met this requirement by a subdivision into sections for the different sciences. The specialization, however, has been favorable to the establishment of local and national societies devoted to single sciences and the various technical branches. All the leading sciences have national organizations in the United States; such are the American Chemical Society (1876), the American Entomological Society (1859), the American Mathematical Society (1888), the American Society of Naturalists (1883), the Astronomical and Astrophysical Society of America (1897), the Botanical Society of America, and the Geological Society of America (1888). The societies of technical science, while somewhat concerned with the professional interests of their members, are chiefly devoted to research. The oldest of these is the American Society of Civil Engineers (1852); others are the American Institute of Electrical Engineers (1884), the American Society of Mechanical Engineers (1880), and the American Institute of Mining Engineers (1871).

Scilla, or **Squills**, a sub-family of the *Liliaceæ*, smooth plants with tunicated bulbs, radical leaves, linear to oblong in shape, and pink, purple, blue or albino flowers, in long racemes, not unlike hyacinths. The blossoms are bell-like, with six spreading perianth segments, and thread-shaped filaments; and the fruit is a round three-lobed capsule. Many species are favorite garden plants as they are hardy, and if left undisturbed, do not fail to bloom very early in the spring. Some of easy culture are the *Scilla siberica*, especially good for rock-gardens; *S. bifolia* and *S. hispanica*, the Spanish jacinth, and the delicate sea-onion of Europe, *S. verna*; the drooping flowers of the fragrant *S. festalis*, are the common bluebells or harebells of English woods, often confounded with the bluebells of Scotland, which are campanulas. The scilla of materia medica produces the familiar croup medicine, and emetic and cathartic syrup of squills. It is *Urginea scilla*, formerly included in the genus *Scilla*, the fleshy bulbs of which are

sliced for market, the extreme outside scales and the central portion being rejected.

Scilly (sil'i) **Islands**, England, a rocky granitic group at the entrance to the English Channel, forming part of Cornwall, about 30 miles from Land's End. They rise abruptly from the sea, form a compact group about 30 miles in circumference, and are about 140 in number; there are only six of any importance, the remainder being mere rocks and islets. The six are Saint Mary, Saint Agnes, Saint Martin, Tresco, Bryher, and Sampson. Saint Mary, the largest, contains Hugh Town, the capital. Telegraph and telephone connections with the mainland and a periodical steamer service with Penzance facilitate communication. The climate is very mild and equable, and plants flourish out-of-doors that do not grow elsewhere in England. The inhabitants are chiefly engaged in flower-growing, agriculture, and fishing. Immense quantities of narcissus and similar flowers are sent to London in spring, and early potatoes and other vegetables are also grown. The grain crops include a small proportion of wheat. On several of the islands are to be seen prehistoric remains of rude pillars, circles of stones, kistvæns, rock basins, and cromlechs. The islands are the unsubmerged portions of the traditional land of Lyonesse.

Scintillation, the scientific term for what is familiarly called the twinkling of the stars. We all know that this cannot arise from any actual change in the light of the star itself; and it must have long been evident that it is due to the atmosphere through which we necessarily see the stars. But the exact way in which the atmosphere produces this effect is a question on which the views of experts have differed. Arago, in an essay on the subject, cites a dozen different explanations of the effect; and since his time many other writers have propounded explanations. But there is not so much divergence between these different theories as might appear at first sight, and physicists of the present day will probably agree upon the essential cause of the phenomenon. If the atmosphere were perfectly at rest, it is certain that there would be no twinkling, any more than there would be in looking at a star through a piece of glass. The stars scintillate because the atmosphere is continually in motion. Invisible waves produced by the ascent and descent of warm and cold currents of air are always present. We can see these waves at the side of a hot stove, or, in summer time, on the side of a brick wall heated by the sun, or on a road passing over the top of a hill when we are so situated that the sky-line is the road itself, and the latter is heated by the sun's rays. In consequence of these wave-like motions, a ray of light coming from a star is continually undergoing a slight refraction or bending of its course, which is changing every moment and is not the same even for two rays side by side. The result is that a ray of light which would reach the eye if it kept on its course is refracted away, while another ray reaches the eye which was not directed exactly toward it. But there may be no relation between these two rays; and thus sometimes for a moment less light will reach the eye, and at the next moment more. Thus we have the scintillation. The rays which

SCIO — SCIPIO ÆMILIANUS AFRICANUS MINOR

actually come to the eye also reach it from slightly different directions. Thus the direction of the star also seems to change in twinkling, but this change is not noticeable except when we use a powerful telescope. Then, in an unsteady atmosphere, the stars seem to dance round and change their form in a manner which is very troublesome to the astronomical observer.

It is not the stars alone which twinkle. If we watch gas or electric lights of an evening several miles away we shall always see twinkling. As a general rule, the planets do not twinkle like the stars unless very near the horizon. This is because their visible disk has a certain surface, so that the rays of light which reach the eye from the planet do not pass through the air along a single fine line, but form a cone of which the breadth at any point is proportional to the distance of the point from the eye of the observer, and may be a foot or more in diameter at a distance of two or three miles.

If we view a bright star through a spyglass and give a slight motion to the latter so as to shake the image of the star round, we shall see that it is continually changing in color, going through most of the colors of the spectrum from red to blue. This is probably caused by the different refractions of the rays of light of different colors, which are separated in the way we have described and then brought together again. The result may be partly due to the interference of light, an effect which cannot be treated in the present article.

The scintillation is always greater near the horizon, and least around the zenith. This is because the layers of the air are denser and more disturbed near the horizon, while the course of a ray of light through them is longer.

SIMON NEWCOMB.

Scio, sī'ō or shī'ō. See CHIOS.

Scio College, located at Scio, Ohio. It was founded in 1857 under the auspices of the Methodist Episcopal Church. There is a preparatory department, and in addition to the regular collegiate course, there is a normal course, and a commercial course. The three degrees of bachelor of arts, bachelor of science, and bachelor of philosophy are conferred. The college has no endowment; the value of grounds and buildings in 1910 was \$70,000; the library contained 10,000 volumes. The students numbered 618, and the faculty 11.

Scioppius, stsē-ōp'pē-oos, Kaspar, German scholar: b. Neumark in the Palatinate, 27 May 1576; d. Padua, Italy, 19 Nov. 1649. He received his education at Heidelberg and at Altdorf, and before the age of 21 had published several learned books, the most noted being his 'Verisimilium Libri Quatuor,' and 'Suspectæ Lectiones,' which attracted the attention of Pope Clement VIII. During a visit to Italy in 1589 he renounced Protestantism, and became a protégé of the Vatican. He is said to have written more than a hundred books, most of them under an assumed name, satirizing the leaders of the Protestant movement. Among his later books the most notable are: 'Grammatica Philosophica' (1628), and 'Paradoxa Literaria' (1628).

Scioto, sī-ō'tō, a river in Ohio which rises in Auglaize County, flows southeast for a few

miles, then northeast into Hardin County, then south by east to near the centre of Marion County, from where its general direction is south to the Ohio River, which it enters near Portsmouth. It is about 200 miles long and is navigable for about 130 miles. It flows through a fertile valley.

Scioto Company, The, in American history, a land-speculating organization formed in 1787 for the purchase of territory along the Ohio and Scioto Rivers. John Cleves Symmes, Joel Barlow and William Duer, of New York, were largely interested. Barlow was sent to Europe in the company's interest as emigration agent. Symmes parceled out the lands to other parties, the tract which now embraces the city of Cincinnati falling to the share of Matthias Denman, Robert Patterson and John Tilson, of New Jersey.

Scipio Æmilianus Africanus Minor, sīp'iō ē-mīl-i-ā'nūs āf-ri-kā'nūs mī'nōr, Publius Cornelius, Roman soldier: b. about 185 B.C.; d. 129 B.C. He was an adopted son of P. Cornelius Scipio, the son of Scipio Africanus Major. He began his public career in 151 when the Roman senate was about to despatch a new army to repress the disturbances in Spain. Exasperated by the constant failure of the wars against the Spanish tribes, the people obstinately refused to serve. At this juncture Scipio came forward, and by a spirited and powerful harangue, made such an impression on the public mind that a multitude of Romans of all classes voluntarily enlisted. In 152 he accompanied the consul Lucius Licinius Lucullus to Spain as military tribune. In 149 B.C. the 3d Punic war broke out, and Scipio followed the army to Africa. He served under the consul M. Manlius Nepos, and by his courage and vigilance rendered important services. Manlius recommended him in the most emphatic manner to the senate. Hence in 147, contrary to the usual custom, not being of the legal age, he was unanimously chosen consul and leader of the forces against the Carthaginians. The Carthaginians defended themselves with desperate courage, but although able to hold out until winter brought a temporary cessation of hostilities, on their resumption Carthage was reduced in 146.

By the express command of the Roman senate this rival of Rome, once so powerful, was demolished and burned. The sight of the ruined city affected Scipio to tears. He was honored with a magnificent triumph at Rome after the war was terminated, and was surnamed the "younger Africanus." After he had lived for some time as a private citizen he was sent with other ambassadors to Egypt, to King Ptolemy Euergetes, where he was much admired for his genuine Roman moderation, and his thirst for knowledge. When he returned (142) he was elected censor. In 134 he entered on his second consulship, in order to put an end to the war long carried on with Numantia. After a siege of eight months he forced a surrender.

For his conquest of this powerful city a triumph was decreed to Scipio, and he received the surname of "Numantinus." In the last years of his life he made himself many enemies among the people by opposing the measures of the popular party, and especially the agrarian law of Tiberius Gracchus, of which Papirius Carbo, and

SCIPIO AFRICANUS MAJOR—SCOLECIDA

Gaius Gracchus, the tribunes of the people, were the great supporters. The circumstances of his death indicate that he was poisoned by his foes.

Scipio Africanus Major, sĭp'ĭ-ō āf-rĭ-kā'nūs mā'jōr, Publius Cornelius, Roman soldier: b. 234 B.C.; d. 183 B.C. In 212 he was unanimously elected ædile, and in 210 became proconsul in Spain. His first successful enterprise of importance was the conquest of New Carthage, the stronghold of the Carthaginians in Spain. For the kindness and magnanimity he displayed on this and other occasions toward the native Spaniards he was rewarded by numbers of them attaching themselves to his standard. The next year (209) Scipio totally defeated Hasdrubal, Hannibal's brother, notwithstanding the latter's advantageous position, but was unable to prevent him collecting more troops, and eventually crossing the Pyrenees to the assistance of Hannibal. In the meanwhile the Carthaginians collected a fresh army, which Scipio decisively defeated in 207. The result of this and subsequent engagements of minor importance was that the Carthaginians were wholly driven from Spain, and the greatest part of their country subjected to Rome. In 205 Scipio was elected consul. He now besought the senate to allow him to lead an army against Carthage herself, and was accordingly empowered to go to Sicily with an army and a fleet, in order, after mature deliberation on the means of effecting a landing on the coast of Africa, to execute the plan he had formed. In 204 he sailed from Lilybæum and landed in Africa, where he prosecuted hostilities with increased vigor, and such success as to oblige the Carthaginians to recall Hannibal from Italy. The Carthaginian army, however, had been by this time so much reduced that that general was able to effect but little, and after some fruitless negotiations for peace the great battle of Zama was fought 19 Oct. 202 B.C., resulting in the total defeat of the Carthaginians. The latter, on the advice of Hannibal, sought for peace, which was granted on hard conditions. On his return to Rome Scipio was honored with a triumph, and received the surname of "Africanus." He was censor in 190 and consul in 194 (with Titus Sempronius Longus). In 189 he was accused of peculation and bribetaking. When his trial came on he contented himself, in answer to the accusations of his enemies, with reminding them of what he had done for the republic, and ended by saying that this was the anniversary of the defeat of Hannibal at Zama, and calling upon the people to neglect all disputes and lawsuits, and follow him to the Capitol, there to pray the gods that they would grant the Roman state other citizens like himself. This they did, leaving the accusers alone in the forum. Scipio immediately quitted Rome, and retired to his villa at Liternum, where he spent the few remaining years of his life.

Scirpus, a large genus of the sedge family (*Cyperaceæ*) universally distributed, often of partial or complete aquatic habit, and either annuals or perennials, very small or very large. The leaves are rush-like, with closed sheaths, and are often reduced to mere scales and sheaths. The small, perfect flowers have usually a perianth of bristles, and are in spikelets, with or without subtending involucre, and mature into variously shaped achenes. The spikelets

are either solitary or in groups, and are very commonly umbelled. These plants are often called rushes or bulrushes, and are common in wet woods or swamps, and often rise conspicuously out of shallow water. *Scirpus cyperinus*, the brown wool-grass, has immense drooping umbels of spikelets, supported on slender cylindrical stems, soft and reddish-brown in color, by reason of the exerted bristles of the perianth. It is perennial by a stout rootstock, is from two to six feet high, with curving grass-like leaves, and is a familiar plant at the edges of forest ponds, growing in colonies. *S. cernuus* is one of the few species cultivated. It is a good pot-plant, having long drooping stems, forming a dense mat at the base, and with solitary spikelets. *S. lacustris*, the great bulrush or mat-rush of the Old World, is known by the latter name because it was employed for meaving into mats, chair-bottoms and cordage, is another cultivated *Scirpus*. It is a curious plant; its culms very smooth, blue-green, and tall, bearing at the top flexuous umbels of spikelets, rise stiffly out of the water of rivers and lakes. The leaves are reduced to sheaths at the base of the culms. This species and the allied *S. tatora*, are the "tules" (q.v.) of the American Southwest.

Scirrhus, or **Hard Cancer**, a scirrhus cancer. See **CANCER**.

Scissor-bill, a bird. See **SKIMMER**.

Scissor-tail, a beautiful flycatcher (*Mimus forficatus*) of the lower Mississippi Valley, which receives its name from its habit of crossing and recrossing in flight the two very long outer feathers of its tail. It is white with dark wings and a roseate flush upon its breast and on the lining of its wings, and is exceedingly graceful. Its general habits are those of the flycatchers.

Scissors. See **CUTLERY**; **HARDWARE**.

Sclerometer, an instrument for the accurate determination of the hardness of minerals. In one form the mineral is mounted on a small carriage moving along a track. Upon this is a lever with weighted diamond point which is in contact with the surface to be tested. Weights are then added to a pulley connected with the carriage until they are just sufficient to move the carriage and produce a scratch on the mineral. In the microsclerometer of Jagger hardness is ascertained with any one of four variables: rate, weight, depth, or duration (see *Amer. Jour. Sci.* IV., 399, 1897). The sclerometer shows that different faces of crystals vary in hardness. By rotating a crystal through 180° and recording the weight required to produce a scratch for each 10°, it is possible to secure data from which the "curve of hardness" can be constructed. Jagger has determined the absolute hardness of some of the minerals in the Mohs scale, assuming a value of 1000 for corundum, as follows: topaz 152, quartz 40, orthoclase 25, apatite 1.23, fluorite .75, calcite .26, gypsum .04.

Sclerotic, **Sclerotica**, or **Sclerotic Coat**. See **EYE**.

Scolecida, skō-lēs'ĭ-dā, a group of worms and worm-like animals, mostly internal parasites, now used only in a general way, as its members have been more scientifically distributed in classification in the phyla *Platyhelminthes*, *Nematoelminthes*, etc.

SCOLECITE — SCOPAS

Scolecite, sköl'e-sīt, a mineral belonging to the natrolite group of the zeolite family. It is a hydrous silicate of aluminum and calcium. When heated before the blowpipe it swells and sometimes curls up like a worm, to which property it owes its name, from the Greek *skolex*, a worm. It then fuses easily to a white, blebby enamel, thus distinguishing it from natrolite, which fuses with equal ease and without intumescence to a colorless glass. Its crystal habit is slender-prismatic and much resembles natrolite. Its crystals are, however, horizontally striated on the prisms and are monoclinic twins, the twinning being revealed by feather-like diverging striations on the clinopinacoid, while natrolite crystals are orthorhombic and show vertical striations in the prismatic zone. Its snow-white or transparent, vitreous crystals are usually clustered in diverging groups. It is also found massive or in radiated nodules. It is a secondary mineral usually in trap or amygdaloid. Among the best known of its many localities are Poona, British India, and Berufoird in Iceland; it has been found sparingly in the United States in the Palisades of the Hudson and at Golden, Colo.

Scollard, sköl'ard, Clinton, American poet and novelist: b. Clinton, N. Y., 18 Sept. 1860. He was graduated from Hamilton College in his native place and was a professor of rhetoric and English literature there 1888-96. He has traveled extensively, and since the last named date has devoted his entire attention to literary pursuits. His early work was mainly verse of a light and musical character evincing great command of metres but with no very salient characteristics. His later verse shows a marked increase of strength as well as melody, while the earlier facility has now become an almost faultless technique. The lyric is his especial field, although he has now and then attempted epic forms. In recent years he has produced several noteworthy historical romances. Among his books of verse may be cited 'Pictures in Song' (1884); 'With Reed and Lyre' (1886); 'Old and New World Lyrics' (1888); 'Songs of Sunrise Lands' (1892); 'Lyrics of the Dawn' (1900); 'The Lutes of Morn' (1901). His most important novels are: 'A Man at Arms' (1898); 'The Son of a Tory' (1900); 'The Cloistering of Ursula' (1902).

Scolopacidae, sköl-ō-pās'ī-dē, a cosmopolitan family of wading birds, comprising the snipes, sandpipers, curlews, and allied genera. The bill is long, very slender and flexible. They frequent bogs and marshes, or the banks of rivers and ditches, where they probe the ground for worms, insects, and testaceous mollusks. In the most modern classification these groups of birds (qq.v.) are combined with the plovers, under the broader name *Charadriidae*, of which all but the plovers (*Charadriinae*) constitute the subfamily *Scolopacinae*. Consult Evans, 'Birds' (New York, 1900).

Scolytidae. See BARK-BEETLES.

Scombridae, a family of percomorphous fishes, comprehending the mackerel (q.v.) and its allies. The body has an elongated fusiform shape, oval in cross-section, with a conical pointed head and deeply forked caudal fin with falcate lobes. The scales are minute and anteriorly form a peculiar area known as the corse-

let, and the prominent lateral line takes a wavy course for its entire length. The mouth is large and armed with strong, sharp teeth, the eye large and the gill-slits extensive and free. Of the fins the pectorals and ventrals are small, the former situated high on the sides and the latter on the belly nearly or quite beneath them; the spinous dorsal is far forward and supported by slender spines; the second dorsal and anal are of similar shape and usually situated near the level of the vent, and each is continued to the base of the tail by a series of small detached finlets. The caudal peduncle is slender and bears lateral keels. The colors are generally metallic steel blue above, marked with bands, streaks or spots of black or yellow, and silvery white or golden below. Internally the pyloric coeca are numerous and the swim bladder may be present or absent. The flesh is oily and a streak of deep red muscle extends along either side and is sharply distinguished from the remaining pale muscles. All of the mackerels are extremely active, predaceous, pelagic fishes, which roam far and wide over the sea in large schools and often approach the coasts to spawn. They are especially well adapted by the form of the body for rapid swimming, and resistance to the water is much lessened by the completeness with which all fins and other prominences can be depressed into recesses, so that they become exactly flush with the surface. The number of genera and species are not numerous, about 12 of the former and 60 of the latter being recognized, but most of them are widely distributed and have occurred or are likely to occur in our waters. Besides the mackerel, some of the most important are the Spanish mackerel, bonitoes, and tunnies or horse mackerels. Consult Jordan and Evermann, 'American Game and Food Fishes' (New York 1902).

Scone, skoon, Scotland, a village in Perthshire, on the left bank of the Tay, a little above Perth, famous as having been the seat of one of the most noted Scotch abbeys. Scone is first mentioned in the beginning of the 10th century and in its abbey, built probably about the same period, was located the famous stone, according to tradition "Jacob's Pillow," on which the kings of Scotland were crowned, and which was carried by Edward I. of England to Westminster Abbey where it rests under the seat of the coronation chair. The last coronation celebrated here was that of Charles II. in 1651. The old abbey is represented only by scattered traces; on the site of the ancient palace stands the fine modern mansion of the Earl of Mansfield. The neat little village of New Scone nearby has about 1,500 inhabitants, chiefly engaged in handloom weaving.

Scopas, skō'pas, Greek sculptor: b. Paros, and flourished between 395-350 B.C. He was the son of Aristandros, a sculptor in bronze, and went to Athens about 377 B.C., where he lived about 25 years. He belonged to the Later Attic School of which Praxiteles was another distinguished member. For the temple of Athena Alea at Tegea he made the sculptures of both pediments and the statues of 'Asklepios' and 'Hygieia' for the interior. In various parts of the Peloponnesus he executed statuary, as for instance, the 'Asklepios' at Gortys, in Arcadia, a 'Herakles' at Sicyon; an 'Athena Pronaos' and an 'Artemis Euclia' at Thebes; also a

group 'Eros, Himeros and Pothos' (Love, Longing and Desire) at Megara. One of his most famous statues was the 'Bacchante,' ornamenting the theatre of Dionysius at Athens; another was the 'Niobé' of which the copy of the lost original is in the museum at Florence. He is credited with having wrought some of the ornamental sculpture of the tomb of Mausolus at Halicarnassus in Caria, portions of which are now deposited in the British Museum. He was more extreme than Praxiteles in his departure from the repose of the earlier Phidian manner. With him sculpture represented many of the violent emotions of life, expressed with great freedom of movement. The lines of the figure, though flexible, were made to convey vehement bodily action, and the face often wore the expression of intense feeling, as, for instance, may be noted in the lines of grief in the face of Niobé. Consult: Perry's 'Greek and Roman Sculpture' (1882), and J. M. Hoppin, 'Great Epochs in Art History' (1901).

Score, in music, the original transcript, of a musical composition, with the parts for all the different voices or instruments arranged and placed in juxtaposition; so called from the practice of drawing the bar through all the parts. As a general rule the highest part should be placed uppermost, the others under it and each other, according to the lowness of the part. All the parts of a chorus should be placed together: the soprano standing on the upper staff, the mezzo or second soprano (if any) on the one immediately below it, and so descending in the following order — contralto, second contralto (if any), tenor, second tenor (if any), bass, and, lowest of all, second bass (if any). A good musician is able to form a pretty close idea of the effects the composer intends to produce by carefully reading the score. See **MUSIC**.

Scorel, Jan van. See **SCHOORL, JAN VAN**.

Scoresby, skôrz'bî, William, English Arctic explorer: b. Cropton, Yorkshire, 5 Oct. 1789; d. Torquay, Devonshire, 21 March 1857. He was the son of a whale-fisher of the same name and made his first voyage with his father in the Dundee when but 10, and for eight years after 1803 they made annual voyages, young Scoresby studying at the University of Edinburgh between voyages. In May 1806 they reached the highest northern latitude (81° 30') then attained. The elder Scoresby resigned his command of the *Resolution* in 1811 and was succeeded by his son, who continued the northern whaling expeditions and at the same time made observations of the electrical phenomena of the Arctic regions and it was through his reports that the government was induced to send out the Arctic expedition under Sir John Ross in 1817. In 1823 after 17 voyages to the Greenland and Spitzbergen regions he quitted whaling, and several years later became a divinity student at Queens College, Cambridge. He was graduated in 1834, ordained in that year and subsequently held various livings and became well known for his philanthropic labors. He visited the United States in 1842 and in 1848, and made a voyage around the world in 1855-6 in the pursuit of magnetic researches. He published: 'History and Description of the Arctic Regions' (2 vols., 1820); 'Journal of a Voyage' (1823); 'Discourses to Seamen' (1831); 'Magnetical Observations' (1839-52); 'Zoistic Magnetism'

(1849); 'The Franklin Expedition' (1850); 'My Father: Being Records of the Adventurous Life of the Late William Scoresby, Esq.' (1851); etc. Consult his 'Life' by R. E. Scoresby Jackson.

Scor'odite, a mineral occurring in small leek-green to reddish-brown quartzoid crystals of orthorhombic form associated with the arsenical minerals of Europe, Siberia, Brazil, Utah, and many other localities. It is also found as a pale green incrustation around hot springs, occurring thus in Nevada and the Yellowstone Park.

Scorpænidae, skôr-pē'nī-dē, a family of marine fishes, represented prominently by the California rockfish (q.v.).

Scor'pio, in astrology, the "accursed constellation," the "false sign," ominous of war, discord, and woe. It is of "watery triplicity," and is attended at its setting by tempests and by autumnal diseases.

Scorpion, arthropod animals forming the order *Scorpionida* of the class *Arachnida* (q.v.), which also includes the spiders, mites, ticks, etc. Like all other *Arachnida* the scorpions possess eight legs; but they are distinguished from the spiders by the possession of a distinctly ringed elongated tail, terminating in a hooked claw or "telson," the outlet and sting of a poison-gland situated at its base. The tail consists of a broader anterior pre-abdomen of seven segments and a slender post-abdomen of five segments and the sting, and it merges gradually into the anterior cephalothorax. There are four pairs of walking limbs borne on the thorax, a pair of large chelate pedipalpi, with crushing jaws at their bases, and a pair of small chelate or nippered jaws or chelicerae, corresponding to the crustacean antennae. The genital ducts open on the basal segment of the pre-abdomen, the second segment bears a pair of comb-like sensory organs and the four succeeding segments each a pair of lamellate respiratory sacs opening by stigmata. The eyes are simple and usually consist of one pair of large ones with from two to five pairs of smaller ones.

The scorpions inhabit warm countries and some of the species of tropical Africa and South America reach a length of 10 inches. The females are said to exhibit great care for their young, and carry them on their backs for several days after being hatched, whilst they tend them carefully for about a month, when they are able to shift for themselves. Scorpions are active at night and by day live in dark places and under stones. The food consists chiefly of insects, which they seize by means of their chelae, and sting to death. The sting is not necessarily fatal to man, that of the smaller temperate species not exceeding the sting of a hornet in severity, but may prove dangerous to persons of weakly constitution. The poison is said gradually to lose its effect on man, so that the more frequently a person is stung the less noxious do the effects of the sting become. Painful effects follow the sting, such as nausea, swelling of the bitten part, etc. The remedies most to be relied upon appear to be ammonia, tobacco, ipecacuanha, etc., together with warm applications to the limb, and attention to prevent the spread of the virus, as by tying a ligature above the wound.

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Among the 20 or more North American species are *Broteas alleni*, with six ocelli, of Lower California; *Vejovis carolinensis*, of the entire southern United States, with eight ocelli; and *Centruus infamatus*, of similar range.

The book-scorpions or pseudo-scorpions (*Pseudo-scorpionida*) are common small forms with short broad abdomen and no sting.

Consult: Kraepelin, 'Scorpions and Pedipalpi' (Berlin 1899); and Banks, 'American Naturalist' (1900).

Scorpion (machine). See ORDNANCE.

Scorpion-fly, a neuropterous insect of the family *Panorpidae*, in which the head is prolonged to form a beak. The body is long and slender. The legs are long, the tarsi being five-jointed; and two spur-like processes exist on the tibiae or shins. The name Scorpion-fly is derived from the appendages attached to the abdomens of some species. In certain species the sixth and seventh joints of the abdomen are attenuated, and capable of extensive motion; while the last joint forms a pair of forceps resembling those of the earwigs. When at rest this tail is curled over the back, but when irritated the forceps are used as weapons of offense or defense. These insects are found chiefly in damp situations, under bushes, etc.

Scorpion-shell, or Spider-shell, one of the strombs (q.v.), so called from the projecting spines with which the shells are provided. The most familiar one (*Pteroceras lambis*) is a mottled chestnut, variegated with white and orange lines. Internally its hue is pale brown and yellow. Its length is three or four inches. The orange-mouthed scorpion-shell (*P. aurantias*) is creamy white outside, and orange within; and its curved spines are white and glistening. These shells are chiefly found in the Indian and Chinese seas; and the genus *Pteroceras* is represented by many fossil species, beginning in the Liassic formations.

Scorpion-spider, or False Spider, a small spider-like arthropod allied to the scorpion, various species of which constitute the order *Pedipalpida*. The body consists of unsegmented cephalothorax and flattened abdomen of 11 to 12 segments. The chelicerae are simple, the pedipalps simple or chelate, the first pair of legs terminate in a many-jointed flagellum. See ARACHNIDA.

Scorzonera, a genus of plant of the tribe *Liguliflorae* of the natural order *Compositae*, found growing in Europe and Asia, but in the United States practically unknown. The roots of *Scorzonera hispanica*, *S. glastifolia*, *S. deliciosa*, and *S. tuberosa* are esculent and often used as diet for invalids, and are also considered antidotes for snake bites. In taste they somewhat resemble asparagus, celery, hazelnuts, and salsify.

Scot, sköt, or Scott, Michael, a mediæval Scottish scholar and man of science: b. probably about 1175; d. probably about 1291. He is said to have studied at the universities of Oxford, Paris, and Bologna. After a period in the service of Frederick II. at Palermo, he continued his studies at Toledo, where he learned Arabic. On leaving Toledo he again repaired to Sicily, where he was closely associated with the Emperor Frederick, to whom he was appointed astrologer. He took orders, and was appointed by Honorius III. to the archbishopric of Cashel

in Ireland, but declined the post. He was at Oxford in 1230, probably sent by Frederick to bring before the university the translations of Aristotle made by himself and others. Scot was a scholar learned in the science of his time, but has been transformed by legend into a magician. As such he is referred to by Dante ('Inferno,' canto xx.) and Boccaccio ('Decameron'), and he plays a prominent part in the popular superstitions of the border districts of Scotland. Many works are attributed to him, of which the following have been printed: 'Liber Physiognomiae Magistri Michaelis Scoti' (1477); a Latin translation of Aristotle's 'De Animalibus' (1496); 'Quæstio Curiosa de Natura Solis et Lunæ' (1622), on alchemy; and 'Mensa Philosophica' (1602), Englished as 'The Philosopher's Banquet' (1614). Consult: J. W. Brown, 'Life and Legend of Michael Scot' (1897); Sir Walter Scott's notes to 'Lay of the Last Minstrel.'

Scot, Reginald or Reynold, English writer: b. Scotshall, Kent, probably about 1538; d. 1599. He studied at Oxford, but returned home without taking a degree, and devoted himself to the study of old and obscure mystical authors, and the pleasures of gardening. The work on which his reputation is founded is entitled 'The Discovery of Witchcraft' (1584), and was directed against the belief in witchcraft, alchemy, astrology, and other prevalent superstitions of his time. King James I. ordered the first edition of the book to be burned by the common hangman, and attempted a reply to it in his 'Demonology.' Refutations were also published by Meric Casaubon, Joseph Glanvil, and others.

Scotch Fir, or Scotch Pine, the only pine (*Pinus sylvestris*) indigenous to Great Britain, but common all over northern Europe, especially in Scandinavia. Trunks of it dating from prehistoric times have been found in peat-bogs. It has two leaves in each sheath, and ovate cones about as long as the leaves, with cone-scales terminating in a pyramidal recurved point. The cones reach maturity in the second year. Scotch firs sometimes attain the height of 120 feet, and although conical when young become picturesque in age, with gnarled, twisted boughs covered at the extremities with dense glaucous foliage and gathered into a mushroom-like head. The straight trunk, sometimes four feet in diameter at the base, has a bright reddish-brown bark, and a heart wood of the same color, which furnishes the lumber called deal, that is nearly as durable as oak. This is so valuable, especially for shipbuilding, that the Scotch pine is extensively planted; naval stores, also, are made from the abundant resin, and the sap-wood, while more perishable than the heart, is used for agricultural purposes, railway sleepers and paving blocks. The bark will serve for tanning.

Scotch-Irish Society of America, an organization founded in 1889 at Columbia, Tenn., its chief object being racial, historical and social. It had 300 members in 1903.

Scotch Music. Much conjectural matter has been written about the origin of Scotch music, discussing, among other questions, whether it was the creation of one of the artistic favorites of James III., or was brought over and naturalized by David Rizzio. That much of

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it is as old at least as the 16th century was proved by a manuscript collection of the tunes in a handwriting and notation which brought them close back to that period. This collection, known as the 'Skene Manuscript,' was edited by a man of scholarly attainments who had devoted himself to musical study—William Daune, F.S.A., Scotland. His conclusions on their value as preserving the music of the country in its original purity are: "The favorable contrast which many of the Scotch airs therein contained present to the dull, tiresome, meretricious productions which from time to time have been palmed off upon the public under that name, and the vitiated copies of the same tunes which have been handed down by tradition alone, are the most gratifying results of its discovery. We are now no longer at a loss for a standard by which we can test the genuineness of our national music, distinguishing the true from the false, the pure ore from all admixture of baser metal." One of the most prominent features of the Scottish music is the prevalent omission of the fourth and seventh in the scale, and the consequent absence of all semitones; another is that the ascending sixth and seventh of the minor scale are not raised as in the model minor scale, but remain the same as the descending sixth and seventh. Modulation often takes place between the major key and its relative minor, and the melody keeps ever true to the diatonic scale of the principal key, no accidentals being introduced. Many airs open in the major key and close on the minor. Closes are not confined to the tonic, and are found on the third, fifth, and sixth, and in Highland music on the second of a major and the seventh of a minor key. Consult: George Thomson, 'Melodies of Scotland, with Symphonies and Accompaniments, by Pleyel, Kozeluch, Haydn, Beethoven, Hummel, and Weber' (six vols. 1822-5); 'The Songs of Scotland,' edited by G. F. Graham; and 'The Songs of Scotland,' edited by Brown and Pitman.

Scotch Terrier. See Dog; TERRIERS.

Scoter, or Surf Duck, a duck of the genus *Edemia*, characterized by a broad short bill, curiously swollen, bright-colored at the base of the upper mandible, and with a hooked nail. These are the most marine of all ducks, though the American species may also occur about the Great Lakes, etc. They are comparatively weak fliers but expert divers and feed chiefly upon mollusks and other animals, for which they dive and grope in the mud of shallow waters. The males of all the species are uniformly velvety black, with or without white markings on the head and wings, and with bright colors on the bill. The females are plain brownish above, grayish below, with dull-colored bills. There are three common American species; the black scoter (*E. americana*), the white-winged scoter (*E. deglandi*), and the surf duck or sea coot (*E. perspicillata*), and the European species occasionally wander into our territory. All of this species breed in the far North and winter within the United States as far south as New Jersey and Chesapeake Bay on the Atlantic and California on the Pacific side. A few may linger through the summer in Maine, etc.; and the second species is the most abundant. The flesh is unpalatable on account of its strong

fishy taste; but this quality permits its being eaten by Roman Catholics on fast-days.

Scotia (skō'shī'ə) **Seminary**, an institution for the education of negro girls located at Concord, N. C. It was founded in 1880 under the auspices of the Presbyterian Board of Missions for Freedmen. There are four departments of study, the Normal and Scientific Department, the Grammar School, the Preparatory Department (elementary grade), and the Industrial Department. Instruction in music is also given; physical training and instruction in hygiene, principles of ventilation, etc., form a part of the curriculum. The normal course extends over two years and the scientific course continues one year longer, and includes instruction in Latin, geometry, astronomy, rhetoric, civil government, nursing, mental science, and ethics. Manual training is a part of the whole course; in the lower classes (Grammar Department) this training is given chiefly by the students doing the work in the boarding department; for the higher classes there are courses in cooking, household economy, and sewing. No tuition is charged except for instruction in music; the institution is largely supported by the Presbyterian Board of Missions. The library in 1904 contained 2,500 volumes. The students in 1903-4 numbered 291; the faculty 18.

Scotists. See SCOTUS, JOHANNES DUNS, and SCHOLASTICISM.

Scotland, skōt'land, **United Kingdom**, the northern division of the island of Great Britain, extending between lat. 54° 38' and 58° 40' 30" N., and lon. 1° 46' and 6° 8' 30" W. It is separated from England substantially by the Solway, Cheviots, and Tweed, the border isthmus being about 60 miles across; but the irregular boundary line, the historic Border-land, measuring fully 100 miles. On all other sides it is bounded by the sea. The greatest length, from north-northeast to south-southwest, between Dunnet Head and the Mull of Galloway, is 287 miles. The breadth varies from 140 miles to less than 30, the latter in the north, between Dornoch Firth and Loch Broom. Few points in the mainland are more than 40 miles from the sea, the country being deeply penetrated by inlets. The country was formerly divided into a number of districts, many of the names of which are still familiar, such as Lothian, Tweeddale, Galloway, Breadalbane, etc., but for political purposes it is divided into shires or counties, as may be seen in table on following page.

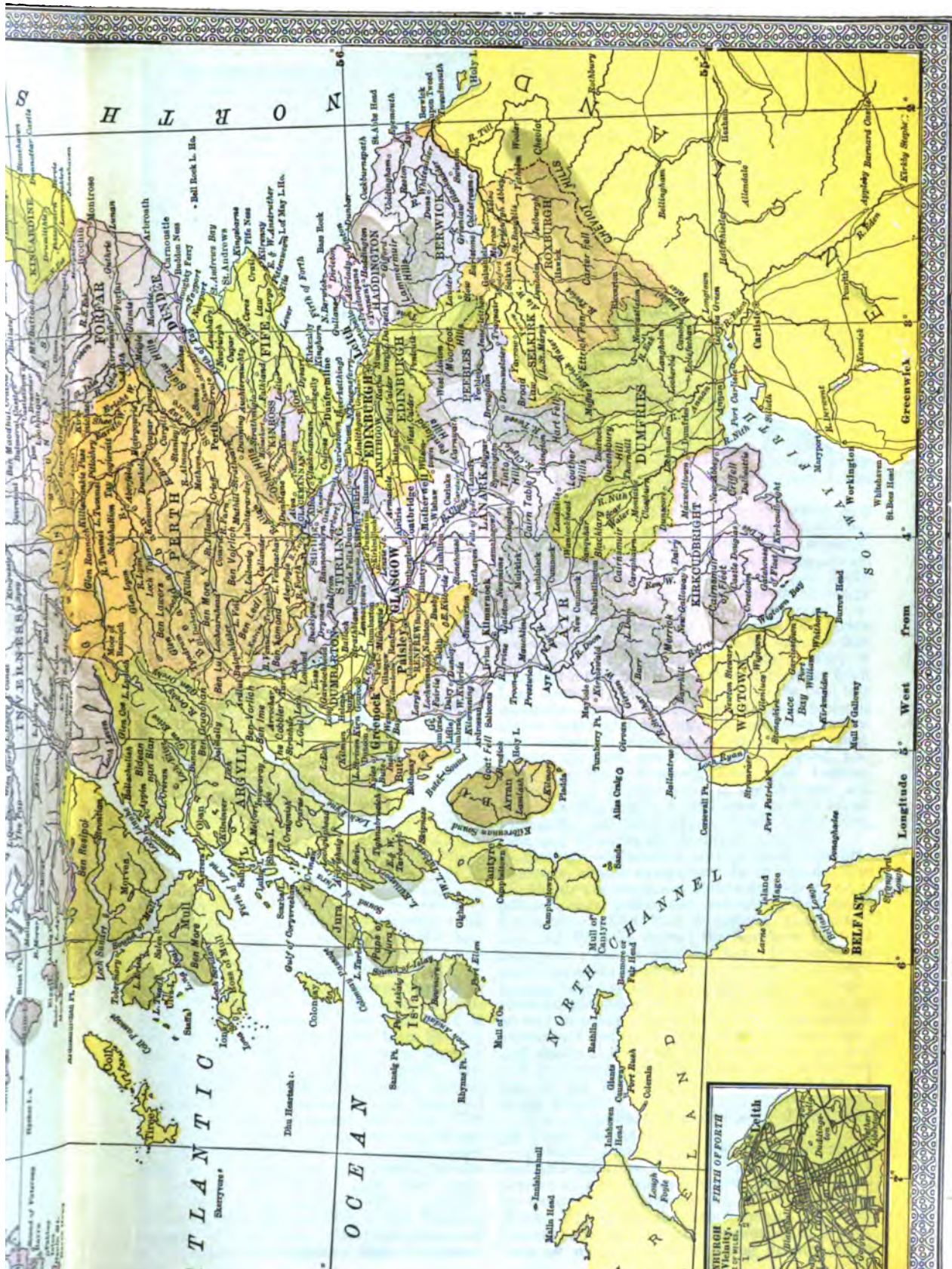
Edinburgh (the capital), Glasgow, Dundee, and Aberdeen each contain upward of 100,000 inhabitants. After these come, in order of population, Paisley, Leith, Greenock, Coatbridge, Kilmarnock, Kirkcaldy, Perth, Hamilton, Motherwell, and Falkirk.

Islands and Coasts.—The islands of Scotland are said to number altogether nearly 800. On the east coast they are few and small; but on the northeast are the two large groups of the Orkneys and Shetlands, the former numbering 52 islands, 28 permanently inhabited; the latter 100 islands, 29 inhabited; while on the west coast the islands are large and numerous. Here the Hebrides (q.v.) extend for 200 miles from north to south, and are divided into the Inner and Outer Hebrides, the former lying

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close to the western coast of the mainland and stretching from Skye to Islay; the latter, parted from the Inner Hebrides by the straits of the Minch and the Little Minch, comprise the long chain of islands from Lewis to Benbecula. Enclosed in the Firth of Clyde are the islands of Arran, Bute, and the Cumbraes, forming a county by themselves. The west coast of the mainland is generally a wild, deeply indented mountain-wall, presenting a series of inlets or sea lochs, while toward the middle the coast is cleft by two great inlets with openings to the southwest, the Firth of Lorn and its continuation Loch Linnhe, and the Firth of Clyde and its ramifications running far inland. The east coast is sometimes low and sandy, but is often formed of steep rocky cliffs of considerable elevation, the chief inlets being the Firths of Forth and Tay, and the Moray Firth, Cromarty Firth, etc.

Counties	Area in sq. miles	Pop. 1891	Pop. 1901
Aberdeen	1,955	284,036	304,439
Argyle	3,213	74,085	73,642
Ayr	1,128	226,386	254,468
Banff	640	61,684	61,488
Berwick	460	32,290	30,824
Bute	217	18,404	18,787
Caithness	685	37,177	33,870
Clackmannan	47	33,140	32,029
Dumbarton	241	98,014	113,865
Dumfries	1,062	74,245	72,571
Edinburgh	362	434,276	488,796
Elgin or Moray	475	43,471	44,800
Fife	492	190,365	218,840
Forfar or Angus	875	277,735	284,082
Haddington	271	37,377	38,665
Inverness	4,088	90,121	90,104
Kincardine	383	35,492	40,243
Kinross	72	6,673	6,981
Kirkcudbright	897	39,985	39,383
Lanark	881	1,105,899	1,339,327
Linlithgow	120	52,808	65,708
Nairn	195	9,155	9,291
Orkney and Shetland	926	30,453	28,699
Peebles	354	28,711	28,166
Perth	2,527	14,750	15,066
Perth	2,527	122,185	123,283
Renfrew	245	230,810	268,980
Ross and Cromarty	3,078	78,727	76,450
Roxburgh	665	53,500	48,804
Selkirk	257	27,712	23,356
Stirling	447	118,021	142,291
Sutherland	2,027	21,896	21,440
Wigtown	485	36,062	32,685
Total	29,785	4,025,647	4,472,103

Orography.—From the configuration and geological structure the country divides into three divisions, the Highlands, Central Lowlands, and Southern Uplands. The first of these divisions lies north of a line stretching in a southwesterly direction from the coast of Kincardineshire to the Firth of Clyde; the third is the country south of a line drawn from Dunbar southwesterly to Girvan; the country between these lines forms the Central Lowlands. The Highland division is remarkable for the number and elevation of its mountain-masses, many of the summits being over 4,000 feet high. The mountains best known by name are the Grampians, which form a system or series of masses covering a large area, and culminating on the west coast in Ben Nevis, 4,406 feet high; while 55 miles to the northeast rises a remarkable cluster of summits reaching in Ben Macdhui the height of 4,296 feet. The Grampians and their connections are separated from the moun-

tains farther to the north by Glenmore or the Great Glen of Scotland, a remarkable depression stretching quite across the country from sea to sea, and forming, by the series of lakes occupying it and the Caledonian Canal connecting them, a waterway from the west coast to the east. The Southern Uplands are also essentially a mountainous region, summits of over 2,000 feet being frequent, though none exceed 3,000 feet above the sea. The central region, though much less elevated than the other two divisions, has none of the monotony usual in flat countries. Though occupying not more than a sixth of the whole surface, the fertility of the soil and its mineral treasures make this part by far the wealthiest and most populous. The present form of the land surface of Scotland is the effect of erosion or denudation. The country was at one time an elevated table-land, the upper surface of which is indicated by the summits of the mountain-masses, but has been deeply trenched and furrowed in all directions by the erosive action of water, ice, and frost. The slope of the ancient plateau is determined by the direction of the principal rivers; in the northern part it is chiefly toward the east, in the southern more equally east and west.

Hydrography.—The chief rivers flowing east to the German Ocean are the Tweed, Forth, Tay, South Esk, North Esk, Dee, Don, Deveron, Spey, Findhorn, etc.; those entering the sea on the west are the Clyde, Ayr, Doon, Dee, Nith, Annan, and Esk. The Clyde in its lower course carries a vast traffic, this being rendered possible chiefly by dredging. Many of the rivers are valuable from the numbers of salmon they produce. A striking feature of the country is the great multitude of lakes, varying in size from Loch Lomond (28 square miles) to the pool-like mountain tarns. In the Northern Highlands almost every glen has its lake and every mountain hollow is filled by a stream or spring. Among the more noted are Lochs Lomond, Katrine, Tay, Earn, Rannoch, Awe, Shiel, Laggan, Lochy, Ness, Maree, Shin, in the Western and Northern Highlands; Loch Leven, in the Central Lowlands; and Saint Mary's Loch, Lochs Ken, Dee, and Doon in the Southern Uplands.

Geology.—The older or Palæozoic rocks predominate almost everywhere in Scotland. The Highlands are composed almost entirely of crystalline schists, gneiss, and quartzites; the Central Lowlands of Old Red Sandstone, Carboniferous, and Permian strata; the Southern Uplands mostly of rocks of Silurian Age. In certain localities remains of secondary formations are represented over small spaces, while volcanic rocks cover considerable areas. Granite exists in great masses in many localities, and in some parts is extensively quarried. The most valuable mineral region is the Central Lowlands, where coal and iron exist in such quantity as to make this one of the most important mineral fields of Great Britain.

For *Agriculture, Manufactures, Trade, etc.*, see GREAT BRITAIN.

Political Constitution.—The parliament of Scotland anciently comprised all who held any portion of land, however small, from the crown by tenure of military service, till the reign of James VI., when the small barons or freeholders were excused from attendance in person, "two or more wise men" being deputed from

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each county in proportion to its size. Its powers were nominally extensive, but the supreme power was virtually in the king, who by his influence often entirely controlled its proceedings. The parliament in the whole consisted of three estates—the nobility, the dignified clergy (consisting of bishops, abbots, and priors), and the lesser barons, or representatives of shires and burghs. When Presbyterianism was formally ratified by law after the revolution of 1688, the ecclesiastical estate ceased to have a place in parliament. Every measure brought before parliament was previously prepared by a committee, styled the lords of the articles, chosen from each of the three orders, but in effect little better than royal nominees. Before the Union there were four great officers of state—the lord high-chancellor, the high-treasurer, the lord privy-seal, and the secretary; and there were also four lesser officers—the lord clerk-register, the lord-advocate, the treasurer-depute, and the justice-clerk. Previously to the era of the revolution the privy-council of Scotland assumed inquisitorial powers, and even torture was administered under the sanction of its authority; but it is now entirely merged in the privy-council of Great Britain. The number of peers in the Scottish parliament was latterly 160, and of commons 155, and all sat in one house, and voted promiscuously. At the union of the kingdoms the political system of Scotland was almost entirely incorporated with that of England. See GREAT BRITAIN; PARLIAMENT.

The Court of Session is the supreme civil court of Scotland. The Court of Justiciary, or criminal court, composed only of judges of the Court of Session, is supreme in the highest sense, since its decisions in criminal cases are not subject to any review. The principal subordinate judicatories are sheriff-courts, established in each county or stewartry. Sheriff-substitutes, or judges ordinary, one or more holding separate courts in different districts, decide in the first instance, subject to the review of the principal sheriff or sheriff-depute, whose decisions, though final within the limits of his jurisdiction, are reviewable by the court of session, with the exception of classes of cases provided for by special statutes. Besides the sheriff-court, each county or district of a county has its justice of peace courts, in which judges, not stipendiary, decide on principles of equity in minor crimes; and in every town of any importance are bailie, dean of guild, and police courts, with limited jurisdictions.

Education.—Scotland has had a national system of elementary education for over two centuries, a school having been established in every parish by a law of 1696 (where such a school was not already established), according to a system proposed by John Knox long before. This scheme did effective service for the education of the people, till the great increase of population, especially in towns, rendered it unequal to the task laid upon it, and this notwithstanding the erection of many schools by various religious denominations. By the passing of the Education Act of 1872 board-schools have superseded the old parish schools, there being also numerous grammar or high schools and academies in every town of any size, though no systematic scheme of secondary education. Other institutions are the normal or training

schools and colleges of the different religious bodies, and the four universities of Edinburgh, Glasgow, Aberdeen, and Saint Andrews. The first university was that of Saint Andrews, dating from 1411; next came that of Glasgow (1450), then King's College and University Aberdeen (1494), then Edinburgh University (1582), lastly Marischal College and University Aberdeen (1593). The two Aberdeen universities were united in 1860. In board-schools now education is practically free.

Civil History.—The country now called Scotland emerges from pre-historic obscurity during the Roman occupation of Britain, though for many centuries little is known of its history. It is supposed that the earliest inhabitants of the country were a non-Aryan race resembling the Iberians, and typified now by the Basques. A Celtic (and Aryan) people seem subsequently to have entered the country, and to have gained predominance over the non-Aryans, the combined people occupying at the Roman invasion most of the country north of the Forth and Clyde estuaries, which was called Caledonia (q.v.) by the Romans, and its people Caledonians. The southern part of the country was inhabited by another Celtic race, the Brythons or Britons, of the same blood as the Welsh. The descendants of the Caledonians were afterward called Picts, and were the predominant people in North Britain at the beginning of the 6th century, when a colony of Scots or Dalriads from Ireland effected a settlement in Argyll, and gradually spread over the adjacent regions. It is from these Scots (a Celtic and Gaelic-speaking people) that the country afterward received the name of Scotland, the original Scotland (Scotia) being Ireland. The Pictish tribes were divided into two great sections, the Piccardach or Southern Picts, and the Cruithne or Northern Picts. In the 9th century the Dalriadic Scots with the help of the Cruithne conquered the Southern Picts, but the Northern Picts, the ancestors of the modern Highlanders, still retained their independence. The Teutonic element was introduced into Scotland as early as the 4th century, when bands from North Germany seem to have formed settlements on the east coast south of the Firth of Forth; and this part of the country was subsequently united to the Anglian kingdom of Northumbria, which extended from the Forth to the Humber. To the west of this kingdom, from Dumbarton to the Solway and into England, extended the kingdom of Strathclyde or Cumbria, inhabited by Romanized Britons.

About the middle of the 9th century Kenneth MacAlpin, son of a ruler of a body of Scots established in Galloway, but of Pictish descent through his mother, united in his own person the sovereignty of both the Picts and the Scots. The Norsemen had already established a footing on the islands of the north and west coasts as far south as the Isle of Man, and a Norse earldom of Orkney was established. Kenneth's kingdom comprised Central Scotland (Argyle, Perth, Angus, Mearns, and Fife), with Scone as capital, the north of Scotland being mostly under independent chiefs, or maormors. The reigns of Kenneth and his immediate successors, Donald I., Constantine I., Grig, Donald II., Constantine II., Malcolm I., Kenneth II., Malcolm II., Duncan, and Mac-

SCOTLAND SCENERY.



1. Fingal's Cave.

2. Duncraig Castle, Loch Carron.

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beth, were one continued scene of warfare with the Norsemen on one hand and with the Britons of Strathclyde and the English of Northumbria on the other. Malcolm I. (943-54) obtained Cumbria (Strathclyde) as a territorial fief from Edmund I., and in 1018 his grandson, Edmund II., secured Lothian, hitherto part of Northumbria, two events which materially influenced the after history of Scotland.

On the advent of Malcolm Canmore (1058) to the throne after the death of Macbeth, the able usurper and murderer of Duncan (see **MACBETH**), the purely Celtic monarchy came to an end.

The conquest of England by William of Normandy, the usurpation of the English throne by Stephen, and various other incidents of English history embroiled Scotland, Sir William Wallace (q.v.) distinguishing himself in disputing the claim of Edward I. to the throne of Scotland and Robert Bruce (q.v.) securing the independence of the country and his title to the throne by the decisive battle of Bannockburn in 1314. He was succeeded by his nephew, Robert Stewart, and he by his eldest son, Robert. He being a weak prince, the reins of government were seized by the Duke of Albany, who starved to death the eldest son of the king, James, the second son, to escape a similar fate, fled to France; in the year 1424 he returned to Scotland, and having excited the jealousy of the nobility, he was assassinated in a monastery near Perth. James II., his son, an infant prince, succeeded him in 1437. He was killed by the bursting of a cannon at the siege of the castle of Roxburgh. James III. ascended the throne at the age of seven years. His reign was weak and inglorious, and he was murdered in the house of a miller, whither he had fled for protection. James IV., a generous and brave prince, began his reign in 1488. He was slain at the battle of Flodden. James V., an infant of less than two years of age, succeeded to the crown. He died in 1542, and was succeeded by his daughter, the celebrated Queen Mary, whose history and tragical end are well known (see **MARY STUART**). She was succeeded by her son James, who, in 1603, ascended the throne of England, vacant by the death of Queen Elizabeth, when the two kingdoms were united into one great monarchy which was legislatively united in 1707. A joint-commission was appointed to draw up articles of union in 1706. The Scottish parliament met to consider the articles, which encountered a strong opposition headed by the Duke of Hamilton, and strongly backed up by the bulk of the people. A majority of the parliament, however, carried the measure, 16 Jan. 1707; it received the royal assent 4 March; and the Union took effect 1 May. The chief provisions of the Act of Union were (1) that the two kingdoms should be united under the name of "Great Britain"; (2) that the succession to the crown of the United Kingdom should be in the Electress Sophia of Hanover and her heirs, being Protestants; (3) that 16 Scottish peers and 45 Scottish members of the House of Commons should be elected to the one parliament sitting in London; (4) that the Established Presbyterian Church of Scotland should be maintained; (5) that Scotland should keep unchanged her own laws and

customs relating to property and private rights, and also the Court of Session and other Scotch courts; (6) that all the rights of trade, free intercourse, and citizenship should be the same for Scotch and English subjects. Henceforth the general history of Scotland may be said to be entirely identified with that of England.

For further information see articles under **GREAT BRITAIN—SCOTTISH HISTORY**; **THE CONQUESTS**; **MEDIEVAL ENGLAND**; **THE REFORMATION**; **THE XVIIIth CENTURY**; **THE XVIIIth CENTURY**; **THE XIXth CENTURY**; **PARLIAMENT**; **CROWN AND CABINET**; **THE JUDICIAL SYSTEM**; **LOCAL GOVERNMENT**; **THE CIVIL SERVICE**; **NATIONAL FINANCE**; **BANKING AND CURRENCY**; **COMMERCE**; **SHIPPING**; **RAILWAYS**; **AGRICULTURE**; **FISHERIES**; **MINING**; **INDUSTRIES**; **RELIGION**; **EDUCATION**; **ARMY**; **NAVY**; etc.

Bibliography.—For topography, ethnology, geology, etc., consult Geikie, 'Scenery of Scotland Viewed in Connection with its Physical Geography' (2d ed., London 1887); Lauder, 'Scottish Rivers' (Edinburgh 1874); Groome, 'The Imperial Gazetteer of Scotland'; Leslie, 'The Gaelic Topography of Scotland' (Edinburgh 1869); Geikie, 'Geological Survey of Scotland' (London 1861-65); Johnston, 'Historical Geography of the Clans of Scotland' (London 1872); Leslie, 'The Early Races of Scotland' (Edinburgh 1866); Anderson, 'Scotland in Pagan Times' (Edinburgh 1883-86); Graham, 'Social Life in Scotland in the 18th Century' (2d ed., London 1900); Rogers, 'Social Life in Scotland' (London 1884-86); Bremner, 'The Industries of Scotland'; Kerr, 'Scottish Banking' (London 1897). For history consult Skene, 'Celtic Scotland' (Edinburgh 1876-80); Lansdale, 'Scotland Historic and Romantic' (Philadelphia 1902); Inness, 'Sketches of Early Scottish History' (Edinburgh 1861); Rhys, 'Celtic Britain' (London 1884); Munro, 'Prehistoric Scotland and Its Place in European Civilization' (Edinburgh 1899); Duke of Argyll, 'Scotland as It Was and as It Is' (Edinburgh 1889); Tytler, 'History of Scotland from Alexander III. to the Union' (Edinburgh 1866); Robertson, 'Scotland under Her Early Kings' (Edinburgh 1862); Burton, 'History of Scotland' (Edinburgh 1899); Mackinnon, 'The Union of England and Scotland'; Rae, 'The History of the Last Rebellion' (1775); Craik, 'A Century of Scottish History'; Struthers, 'The History of Scotland from the Union to the Abolition of the Feudal Jurisdiction'; Chambers, 'History of the Rebellions in Scotland.' Consult also the bibliographies appended to articles under **GREAT BRITAIN**.

Scotland, Church of. SEE **DISCIPLINE**, **BOOK OF**; **PRESBYTERIANISM**.

Scotland, Language and Literature of. *1. Language.*—Previous to 1400, the term "Scottis," i. e., Scottish or Scots, was used in Scotland exclusively to refer to Gaelic, the language of the Celtic inhabitants of the north and west; the speech of the Lowlands being then and for a century later known as English, of which it was in fact a dialect. But after 1500 it became common to speak of the Lowland tongue as "Scots," distinguishing it on the one hand from the English of the south of the Tweed, and on the other from Gaelic, which had come to be

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known as "Erse." In the first part of the 16th century, this Lowland Scots practically achieved the dignity of a separate national language; and though to-day its place has been taken by English in the schools, the courts, the pulpit, the press, and in cultivated society, it is still, though corrupted and broken into a score of local dialects, the speech of the humbler classes in the Lowlands.

As to origin, Scots is in the main a development of Northumbrian, the Teutonic language spoken by the Anglian settlers in the region between the Humber and the Forth. Of the steps in this development previous to the 13th century we have, for that part of Northumbria lying north of the Tweed, little direct evidence; and when finally we find, about the beginning of the 14th century, undoubted Scottish documents, the language differs little if any from what is known as Northern Middle English. This identity is natural enough when we remember that the boundary between the kingdoms had been for centuries a shifting one, the border counties being now English, now Scottish. But after the present frontier was virtually settled, the wars over Scottish independence, the chronic estrangement which they produced between the two kingdoms, and the political alliance with France, all combined to produce conditions which made probable a separate linguistic development for Scotland; so that by 1450, when the Midland dialect had practically driven all others out of the literary field in England, Scots (now called Middle Scots, as distinct from the previous stage of Early Scots) was in a fair way to independence. The flourishing of a national literature in the years between 1475 and 1550 aided this development; and in spite of the great influence of Chaucer, Gower, and Lydgate, the northern tongue reached, in the first half of the 16th century, its point of greatest dissimilarity to English. The basis of the language remained, of course, the same as that of English, except that it was from the Northumbrian form of the parent speech that it was derived. The inflections had tended to disappear earlier in the Northern than in the Midland dialect, larger admixtures of Norse and Celtic had taken place, and, though English had absorbed more French, Scots had received independently many French words not found in the south. There was, besides, in the Scottish writers of the 16th century, a strong tendency to import words direct from the Latin, and we find, especially in the courtly style of the period, a large number of barely naturalized Latinisms that found no permanent home in the vernacular.

Had nothing arisen to disturb the detachment of the two kingdoms, it seems likely that a sister language to English would have been established in the north, with distinct qualities of vigor, music, and picturesqueness of its own. But the effect of the Reformation was to enable England to displace France in Scotland's foreign relations; and the influence of Protestant England on the speech of the Scottish pulpit was greatly strengthened by the acceptance in Scotland of English translations of the Bible. These forces, which have continued to work in Scotland to the present day, soon accustomed the common people to the use, if not of pure

English, at least of a highly Anglicized form of Scots; and while supplying the peasantry with a polite dialect for purposes of religion and intercourse with the gentry, left the national language, now devoted to more homely uses, to become a mere *patois*. The moving of the Court from Edinburgh to London at the Union of the Crowns in 1603, still farther accentuated the change, both by deciding that English was to be the language of high society throughout Britain, and by making clear to Scottish men of letters that, if they were to reach the larger audience, they must cultivate the language of "the predominant partner."

Thus passed the possibility of a real national language for Scotland. Various attempts to restore it were made from time to time, and with the intellectual revival in Scotland in the 18th century, Allan Ramsay, Fergusson, and finally Burns, turned once more to the vernacular as their medium of expression. But it was a greatly changed vernacular. The century and a half of the domination of English in matters of culture had reduced its scope; and broad Scots could be maintained only in the treatment of a limited range of subjects. Even in these, English and semi-English forms constantly intruded, and anything like a pure descendant of the pre-Reformation Scots of Lindsay and Douglas it is impossible to find. Though the old tradition, impoverished as it was, was valiantly upheld by Burns, and turned to artistic uses with amazing success, yet with Burns the account is practically closed. He has had many imitators; other authors of Scottish birth have written in the dialect; but we are not again to have a Scots writer using the old tongue as his normal literary medium. The race of the "makars" is ended, and the dialects into which the old speech has disintegrated, have crept into corners to die.

II. Literature.—Few vestiges of the earliest writings in Scots have survived. Some fragments of patriotic verse have come down from the troublous times following the death of Alexander III, but the earliest name is that of Thomas the Rhymer of Erceldoune, a shadowy figure long regarded as a prophet. He seems to have flourished in the end of the 13th century, and is himself the hero of the romance of 'Thomas of Erceldoune.' His name is connected with the Northern romance of 'Sir Tristram;' but no general agreement has yet been reached as to the probability of his authorship. The poem itself is a paraphrase from the French, written in an elaborate stanza, but without great poetic distinction. Somewhat later than Thomas, but hardly less shadowy, is another supposed writer of romance, Huchown of the Awle Ryale, who, according to Wyntoun,

Made the gret gest off Arthure
And the Awntyre off Gawaine,
The Pystyll als off Swete Swsane.

The last of these is easily identified with a version of the story of Susanna and the Elders, written in a difficult stanza with interlacing rimes and alliteration. But the relation of the extant poems on Arthur and Gawain to those mentioned by Wyntoun is a puzzle yet unsolved, as is also the identity of Huchown himself, whom some have found in a certain Sir Hew of Eglintoun, who died in 1375. Practically all the

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anonymous Northern romances have been assigned to Huchown; but the absence of criteria of dialect sufficient to place these poems definitely on either side of the border makes it difficult to decide which, if any, of them should be regarded as Scottish literature.

With the author of 'The Bruce' we come out into clear daylight. John Barbour (?1320-1395) was in 1357 already Archdeacon of Aberdeen, and we have record of his employment in clerical offices about the royal household. 'The Bruce,' on which he was at work in 1375, is a celebration of the life and exploits of Robert I., written in the octosyllabic couplet and in the general manner of the metrical romances. It contains much history and some—it is uncertain how much—fiction. The poet was contemporary with many who knew Bruce, and it is more than probable that much of his material was derived from eye-witnesses of the events related. His work is raised above the level of mere chronicle by the warmth of his patriotism and hero-worship, and by the vividness of occasional sketches of character and incident. To the same author have been attributed fragments of a poem on Troy and a collection of saints' legends, but neither ascription is now believed to be valid.

Barbour's patriotic task was carried on in the beginning of the next century by Andrew of Wyntoun (fl. 1395-1424) in his long and uninspired 'Orygnalle Chronykil,' a history of Scotland in octosyllabic couplets, from the creation of the world to the reign of James I. A third poem with patriotic purpose is 'The Wallace,' usually attributed to Henry, a blind minstrel who flourished in the latter half of the 15th century. It is stated by the historian John Major (b. 1469) that this Henry, blind from birth, composed a book on Wallace when Major was a boy; but the manuscript of the extant 'Wallace' has no reference to Henry, and it is highly doubtful whether this is the poem alluded to by Major. Our 'Wallace' is a long poem in the heroic couplet, which claims to be based on an alleged Latin work by an unknown John Blair. It is fiercely patriotic in tone, highly unreliable as history, and full of incredible accounts of feats of the hero against the hated English. It is the chief source of the legends of Wallace on which the patriotism of Scottish children is still fed, and in a modernized version, made by Hamilton of Gilbertfield in 1722, it continued popular into the 19th century. It is probably the earliest poem in Scots to employ the heroic couplet.

The influence of Chaucer occasionally discernible in 'The Wallace' had already made itself evident in Scotland in 'The Kingis Quair' of James I. This is a beautiful example of the conventional love-allegory of the Middle Ages, written in the 7-line stanza of Chaucer, and in a form of Scots greatly modified in imitation of Chaucer's English. The heroine is apparently Lady Jane Beaufort, whom James married at the close of his captivity in England; but precise autobiography should not be sought in an allegory. There is no more charming specimen of this type of love-poem in any English dialect; and the romantic character and tragic death of its royal author have combined with its poetic quality to give it a unique place.

Contemporary with Blind Harry was the most versatile and original poet Scotland had yet known, Robert Henryson (?1425-?1506), schoolmaster in Dunfermline. His greatest single achievement is 'The Testament of Cressid,' a continuation of Chaucer's 'Troilus.' Here in some two hundred stanzas of rime royal he tells of the poetic justice which overtook Cressida. The poem is smooth in versification, tender in feeling, splendidly dramatic in its treatment of the great moments of the story, and, though less subtle in psychology than Chaucer's masterpiece, more rapid in narrative. Henryson's 13 'Fables' are the first considerable collection of the kind in any English dialect. Though the stories themselves belong to the general tradition of fable literature, they are told here in a greatly expanded form, with abundant local color, much invention of vivid detail, shrewd interpretation of character, and a lively sense of humor. In 'Robyn and Makyne' Henryson appears as the first importer of the pastoral. Though the situation and names are familiar in French literature, the treatment is such as to make the little piece thoroughly Scottish. In addition to the works enumerated, Henryson wrote a number of religious and contemplative poems, leaving altogether a body of work small in bulk, but surprising in its variety, originality, and its high imaginative level. There is no poet in our literature whose merits so far surpass his reputation. Probably also belonging to the 15th century are some poems whose date is difficult to fix on account of the fact that they are preserved only in a late form. Of these, 'Rauf Coilyear' is a lively offshoot of the Charlemagne cycle; and 'Pebbles to the Play' and 'Christis Kirk on the Green,' rollicking pictures of rustic revelry, have been ascribed to both James I. and James V.

Early Scottish poetry is generally regarded as having reached its height in William Dunbar (?1460-?1520). Most of Dunbar's life was spent about the court of James IV., where he remained in the hope, never fulfilled, of receiving a fat benefice. He wrote in two styles which may as a rule be fairly easily distinguished. In the one, his "aureate" style, are composed his courtly allegories, complimentary addresses, and devotional poems; in the other, his satirical and humorous poems. The aureate style is laden with Latin words of the type of "celsitude" and "pulchritude," often coined for the occasion; and the versification, especially in its rime schemes, is often very elaborate. Among the most notable in this style is 'The Golden Targe,' a prettily worked-out allegory of the Court of Love type, differing from the mass of poems of its kind chiefly by the firm hold kept by the poet on the psychological significance of his symbols and personifications. 'The Thrissil and the Rois' belongs to the same class, and celebrates the marriage of James IV. to Margaret Tudor. Of the poems written in the broader vernacular, the most extreme is the 'Flying' with Andrew Kennedy, a contemporary poet who has left but a few poems besides his share in this duel. The poem belongs to the class of scurrilous invective common in Italy during the Renaissance, and is coarse and revolting beyond expression. Equally strong in vernacular flavor is 'The Dance of the Seven

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Deadly Sins,' a vividly grotesque picture of the lower world. Dunbar's 'Dregy' is of the familiar mediæval type of the parody upon religious services, and is carried out with more humor than reverence. The many poems on abuses in the court, the sessions, and the Church, lose interest for the modern reader on account of the ephemeral nature of their themes; but both these and the devotional poems habitually exhibit technical mastery. Perhaps the greatest single achievement of Dunbar is 'The Lament for the Makars,' a stately and melancholy chant written in time of sickness, lamenting the mortality of the race of poets. It is in 4-line stanzas, each concluding with the sombre Latin refrain, "Timor mortis conturbat me." Belonging to the older tradition of unrimed alliterative verse, 'The Twa Merrit Wemen and the Wedo' is a cynical but extremely lively and indecorous sketch, probably inspired by the Prologue to Chaucer's 'Wife of Bath's Tale.' The most notable quality of Dunbar's work in point of content is its reality, the sense of immediate contact with life; in point of form, the quite extraordinary variety and skill shown in the versification, and the brilliance and point of the diction.

Gavin Douglas (1475-1522) was the third son of Archibald, Earl of Angus. Like Dunbar, he was a churchman, but of far other fortunes. Provost of Saint Giles in Edinburgh and later Bishop of Dunkeld, he was led by his family connections into various political and diplomatic activities, and the fall of his house from power led to the loss of his bishopric and his exile. He died in London of the plague in September 1522. His 'Palice of Honour' is the most elaborate specimen of the allegory in Scots, and it exhibits most of the vices of its kind. It abounds in descriptions of pagan deities in procession and of wonderful gardens and castles, written in fluent verse decorated with copious "aureate" terms; and the classical element is varied by a suffusion of Catholic theology and morality. But the style lacks fire, and the allegory itself is rambling and incoherent. 'King Hart,' the ascription of which to Douglas is usually though not universally accepted, is a shorter production of the same general type, more directly didactic in aim, but also much clearer in conception. But Douglas's fame depends chiefly upon his translation into heroic couplets of the twelve books of the 'Æneid,' with the addition of the supplementary book by Maphæus Vegius, and original prologues to each book. The work is notable as the first complete translation of a classical poem into verse in Britain, and is in itself no small achievement. Some of the prologues are remarkable for highly realistic descriptions of nature, in which the "catalogue" method is carried to an extreme.

The last notable figure of the group carries us down almost to the date of the Scottish Reformation. Sir David Lindsay of the Mount (1490-1555) became attached to the royal household while still a young man, apparently as some kind of entertainer; and in 1512 he was appointed attendant to the infant King James V. Later he was knighted and made Lyon King at Arms, an office which carried with it, besides heraldic and diplomatic functions, the supervision of court fêtes. His poetry begins with

'The Dreame' (1528), an allegorical vision in rime royal, combining science with the exposure of contemporary abuses. 'The Complaynt to the King' (1529) presents a request for reward in the manner of Dunbar, recalls the poet's early intimacy with the King, and criticises his advisers. 'The Testament of the King's Papyngo' (1530) contains much political matter and some very frank satire on the priesthood. 'An Answer to the Kingis Flyting' shows Lindsay engaged in a political altercation with his master, scarcely less scurrilous than that between Dunbar and Kennedy. Satire on the court appears also in the 'Complaynt of the Kingis auld Hound'; 'The Jousting between Watson and Barbour' ridicules a mock tournament between two court physicians; the 'Deploiraioun of the Death of Queen Magdalene' is an official production on conventional lines; 'Kiteis Confession,' an amusing attack on the Confessional; 'Ane Supplicatioun againis Syde Taillis,' a witty if coarse satire on feminine fashions. 'The Tragedy of the Cardinal' (1547) is a virulent attack on Cardinal Beaton, lately murdered. 'The Historie of Squire Meldrum,' the freest of his poems from satire or didacticism, is a narrative of the martial and amorous adventures of a contemporary laird, modeled on the mediæval metrical romance, and exhibiting a lighter touch and more charm than anything else of Lindsay's. His last work, the 'Dialogue concerning the Monarchie,' is a long and tedious production dealing with the history of the world and the kingdoms thereof from the Creation to the Day of Judgment. But by far the most important of his works is his 'Satyre of the Thrie Estaitis,' a vigorous Morality with interspersed Interludes, satirising the various abuses under which Scotland suffered, with special stress on the corruption of the clergy, and offering abundant advice to the King, before whom it was acted in 1540. From this enumeration of his works it will have appeared that Lindsay was much more a reformer than an artist. But his vigor and sincerity, his earnestness and outspokenness, not only made him a powerful force in the overthrow of the Catholic Church in Scotland, but enabled him alone of the pre-Reformation poets to remain popular in the following centuries. Over 50 editions of his works, in whole or in part, have been issued since his death.

In spite of the absorbing interest of religious controversy, there existed a group of poets in Scotland in the second half of the 16th century who wrote on other themes. Alexander Scott (1547-1584) is almost exclusively a love-poet; and his 36 surviving pieces exhibit such technical skill in versification and so much genuine lyrical power as to make him, in this respect, the most worthy predecessor of Burns. Alexander Montgomerie (?1540-?1610), his disciple, worked under the further influence of that movement in English poetry which is represented by Tottel's 'Miscellany,' as is seen by the frequency of the sonnet among his verse-forms. He seems to have invented the peculiar 14-line stanza, imitated by Ramsay and Burns, known by the name of the first poem written in it, "The Banks of Helicon." His more popular poem, 'The Cherry and the Slae,' is in the same form; and he experimented largely in other stanzas. His

chief subjects were love, nature, and religion; and he added one more to the list of Scottish flytings. More interesting than the work of the minor writers of the period such as Maitland, Sempill, and James VI. is the book of 'Gude and Godlie Ballates,' a remarkable collection of Protestant verses, many of them violently controversial, written to the tune and often parodying the words of popular secular songs, and intended for purposes of propaganda. Most of them are ascribed to James and John Wedderburn, whose brother Robert wrote anti-Papist plays.

Of literature in vernacular prose Scotland has little to boast. Most of that written before 1600 is translation, the most important being the anonymous 'Complaynt of Scotlande.' This curious work was written by a strong partisan of the French as opposed to the English alliance, and the scheme of the allegory on which the political part of the work is based is adapted from 'Le Quadrilogue Invecitif' of Alain Chartier. More original than this serious setting forth of the woes of Scotland and their remedies is an inserted 'Monolog Recreative,' containing a mass of curious description, with lists of popular songs, tales, and dances, used by a group of shepherds. The works of Knox and his followers and opponents belongs to religious controversy rather than to literature; and most of the writings of George Buchanan (q.v.), the great Scottish humanist, were in Latin. Through the whole period so far discussed flourished the traditional Ballads (q.v.), which vie in interest and value with the works of the known authors.

In the period following the Union of the Crowns, the most important men of letters such as Sir Robert Ayton, William Alexander, Earl of Stirling, and Drummond of Hawthornden, wrote in English. One family, the Sempills of Beltrees, kept up the vernacular tradition, and Sir Robert (1595-1660) revived in 'The Life and Death of Habbie Simson' the 6-line stanza which has come to be the recognized vehicle for Scottish elegy. Most of the songs of this period are anonymous, but the names of Lady Grizel Baillie, Lady Wardlaw, and Hamilton of Gilbertfield show that the dialect could still be written by the upper classes. Hamilton is the chief link between the Sempills and Allan Ramsay (1686-1758), whose work both as a poet and as a collector marks the definite revival of the vernacular. Ramsay was first a wig-maker and then a bookseller as well as a poet, and we owe much to his enterprise in issuing his two collections, 'The Tea-Table Miscellany' containing songs old and new, Scots and English, and 'The Evergreen,' selections of Scots verse, chiefly from the Bannatyne MS. He wrote himself many songs, tales, and fables, his most popular work being the pastoral drama, 'The Gentle Shepherd.' The corruption of the later Scots is abundantly exemplified in Ramsay's diction; and the substance and tone of his poems suffer from an analogous defect in the mixture of Scots and English influences. Yet his songs were undeniably popular; he has some gift of comedy and satire; and he has gained through his pastoral a prominent position in that field. As an editor he helped to preserve older poetry which might otherwise have been

lost, and to revive interest in the national literature; but his methods were those of his time, and he amended and "improved" ruthlessly.

Ramsay's activity was followed by the production of many good songs by a variety of writers, but none of the importance of Robert Fergusson (1750-1774), a youth of genius, whose career in too many respects foreshadowed that of Burns. He sought relief in conviviality from the drudgery of a clerkship, fell a victim to religious melancholy, and died mad at twenty-four. In his Scots verse Fergusson carried on the national tradition both as to language and versification, and displayed gifts not only of wit and humor but of genuine poetry, and a sense of style much surpassing Ramsay's. In his poems Burns found inspiration and models for some of his most popular productions; and he has left in poems like 'Auld Reekie' a vivid picture of the Edinburgh of his day.

In the achievement of Robert Burns (q.v.) Scottish poetry reached its climax and virtually its conclusion. A few poets whose lives overlapped his have been hailed by their respective admirers as his successors. Joanna Baillie (1762-1851) wrote some good humorous songs; Caroline Oliphant, Baroness Nairne (1766-1845), sang with poignancy the pathos of the lost Jacobite cause; and James Hogg, the Ettrick Shepherd (1770-1835), her rival in Jacobite lyric, attempted a much more ambitious task in 'The Queen's Wake.' Two at least of the poems in this composite and uneven work are worthy of remembrance, the delicate and charming 'Kilmeny,' and the weirdly humorous 'Witch o' Wife.' Many song-writers must be left unmentioned here. Scott, Stevenson, and their successors wrote occasional vernacular lyrics and introduced vernacular dialogue into their novels, but the day for the spontaneous and complete use of Scots as a medium of expression by Scottish men of letters is past.

Bibliography.—The authoritative account of the origins and development of the Scots language is Dr. J. A. H. Murray's 'Dialect of the Southern Counties of Scotland' (London 1873). For the literature, Dr. Irving's 'History of Scottish Poetry' has been largely superseded by T. F. Henderson's 'Scottish Vernacular Literature' (London 1898), and the less satisfactory 'Literary History of Scotland' by J. H. Millar (New York 1903). Dr. J. M. Ross's 'Scottish History and Literature to the Period of the Reformation' (Glasgow 1884) and Hugh Walker's 'Three Centuries of Scottish Literature,' from the Reformation to Scott (2 vols. Glasgow 1893), taken together give a fairly complete view of the subject. Most of the works of the earlier writers are now accessible in the publications of the Scottish Text Society; and the 'Famous Scots' Series supplies biographies, of very varying value, of all the more notable writers. WILLIAM A. NEILSON,

Professor of English, Harvard University.

Scott, skōt, Austin, American college president: b. Maumee, Ohio, 10 Aug. 1848. He was graduated from Yale in 1869, and later became private secretary to George Bancroft, the historian. In 1883 he was called to Rutgers Col-

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lege, where he taught in the departments of history and political economy until he became its president in 1890.

Scott, Clement, English author and journalist: b. London 6 Oct. 1841; d. 25 June 1904. He was educated at Marlborough College and became widely known as a dramatic critic to the *Daily Telegraph* in 1873. Previous to his editorship of 'The Free Lance' he was a well-known writer upon the staff of the 'Sunday Times,' the 'Weekly Dispatch,' the London 'Figaro,' and other publications of note, and in 1880 became the editor of the 'Theatre,' a London magazine. He was the author of: 'Lays and Lyrics'; 'Thirty Years at the Play'; 'From the Bells to King Arthur'; 'The Wheel of Life'; 'Madonna Mia'; and 'The Drama of Yesterday and To-day.'

Scott, David, Scottish painter: b. Edinburgh 10 Oct. 1806; d. there 5 March 1859. He early determined to become a painter, and began by drawing vignettes and frontispieces for books. In 1827 he formed an association with some artists, who founded the Life Academy for the study of the living model. The following year he exhibited his first picture, 'The Hopes of Early Genius Dispelled by Death.' 'The Combat of Fingal with the Spirit of Lodi,' 'Sarpedon Carried by Sleep and Death,' 'Monograms of Man,' and other works painted between 1828 and 1832 indicated the wild and incoherent character of his genius, and the numerous large canvases which he filled with tireless industry and enthusiasm quite failed in producing the effect he anticipated, his pictures being grandly conceived, but wanting in color and finish. In 1841 he exhibited what has generally been considered his greatest picture, 'Vasco de Gama Encountering the Spirit of the Storm at the Cape,' which was subsequently purchased for the Trinity House at Leith. His whole career was an arduous struggle, not with absolute failure, but with a success far from adequate to his aspirations, and he must be looked upon as the Scottish counterpart of Haydon.

Scott, Dred, American negro slave: b. Missouri about 1810; d. after 1857. See DRED SCOTT CASE.

Scott, Duncan Campbell, Canadian poet: b. Ottawa, Ontario, 2 Aug. 1862. He was educated at Stanstead College, and entered the Canadian civil service in 1879. Besides his contributions of verse to the current periodicals, he has published in verse: 'The Magic House' (1893); 'Labor and the Angel' (1898); and in prose, 'The Village of Viger,' a collection of stories (1896).

Scott, Eben Greenough, American author: b. Wilkesbarre, Pa., 15 June 1836. He was graduated from Yale in 1858, and is the author of: 'Interstate Law of Pennsylvania'; 'Development of Constitutional Liberty'; and 'Reconstruction.' During the Civil War.

Scott, Sir George Gilbert, English architect: b. Gawcott, near Buckingham, 13 July 1811; d. London 27 March 1878. While still a youth he was placed by his father in the office of an architect, where his tastes drew him mainly to the study of Gothic architecture. The Martyrs' Memorial, erected at Oxford in 1841, was the first work which brought him into notice. It

was followed by the new church at Camberwell, and in the same year he was the successful competitor for the rebuilding of the church of Saint Nicholas at Hamburg, which had been destroyed by fire. Among his other designs are included the cathedral church of Saint John's, Newfoundland; Glasgow University; Leeds Infirmary; chapels at Exeter College, Oxford, and Saint John's College, Cambridge; the Memorial to the Prince Consort, London; Saint Mary's Cathedral at Edinburgh, etc. Toward the close of his life he was engaged in carrying out the restoration of the cathedral at Saint Albans. Among the restorations accomplished by him are those of many English cathedrals. He was the author of 'Plea for the Faithful Restoration of Our Ancient Churches' (1850); 'Conservation of Ancient Architectural Monuments' (1864); 'Lectures on the Rise and Development of Mediæval Architecture' (1878); 'Personal and Professional Recollections' (1879).

Scott, Hugh Lenox, American military officer: b. Danville, Ky., 22 Sept. 1853. He was graduated from the United States Military Academy in 1876. During his service at various army posts in the West he wrote an important monograph on Indian sign language, and was promoted for bravery in the last of the Ghost-Dance outbreaks of the Sioux in 1891. He was in command of the 1st Army Corps in the Spanish-American campaign of 1898, and was appointed adjutant-general of the Department of Cuba in 1900.

Scott, Hugh Stowell, English novelist, known by the *nom de plume* "HENRY SETON MERRIMAN": d. Ipswich 19 Nov. 1903. He was a short while in business, made numerous sea voyages, finally devoted himself wholly to literature, and from the appearance of his novel 'The Phantom Future' in 1889, wrote a long series of somewhat melodramatic works of fiction, particularly successful when dealing with Russia and Nihilistic plots. His best book was perhaps 'The Sowers' (1896). Others are: 'Suspense' (1890); 'With Edged Tools' (1894); 'Flotsam' (1896); 'Roden's Corner' (1898); 'The Isle of Unrest' (1900); 'The Vultures' (1902).

Scott, Irving Murray, American ship-builder: b. Hebron Mills, Md., 25 Dec. 1837; d. San Francisco, Cal., 29 April 1903. He received his early training at the Mechanics' Institute of Baltimore. In 1860 he went to San Francisco and entered the Union Iron Works as expert draughtsman and engineer. In 1863 he became its superintendent, and two years later its general manager and vice-president, in which office he continued until his death. He first became widely known as the inventor of the machinery used in the famous Comstock mine. In later years he established a reputation as an authority in naval construction, and was the builder of the United States battleships Oregon and Olympia, and other war vessels.

Scott, James George, British civil officer in India: b. Dairsie, Fifeshire, England, 25 Dec. 1851. He was educated at Edinburgh University, Oxford, and served as war correspondent in India and China, 1875-85. In 1888 he was a member of the Burma Commission, in 1889-90 of the Anglo-Siamese Boundary Commission; *chargé d'affaires* in Bangkok, 1893-4; and a

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member of the Burma-China Boundary Commission 1898-1900. He became superintendent of the Southern Shan States in 1902. His publications include 'The Burman, His Life and Notions' (1882); 'France and Tongking' (1885); 'Burma, as it Was, Is, and Will Be' (1886); 'The Upper Burma Gazetteer' (1901).

Scott, James Hutchinson, American naval officer: b. East Liberty, Pa., 11 Feb. 1868. He was graduated from the Cadet School of the Revenue Cutter Service in 1890, assigned to duty on the revenue cutter *McLane*, and at the outbreak of the Spanish-American War was appointed executive officer of the revenue cutter *Hudson*, with which he played a notable part at the battle of Cardenas Bay, Cuba, 11 May 1898. He received a medal from Congress for gallant conduct, and after the war was assigned successively to the revenue cutters *Manhattan* and *Washington*. He was navigator on the *Gresham* when she rescued the Portuguese *Fraternidada*, saving 113 lives, and later was appointed executive officer of the *Perry*. He resigned 1 July 1901, receiving the first official letter of regret ever sent to an officer, and later entered the service of the Pennsylvania Railroad Company.

Scott, Julian, American artist: b. Johnson, Vt., 14 Feb. 1846; d. Plainfield, N. J., 4 July 1901. He entered the Northern army in 1861 and while in service made his mark by his sketches of hospital life. He entered the National Academy, New York, in 1863, and subsequently studied under Emmanuel Leutze. He became an associate of the Academy in 1871. His pictures are largely scenes of army life, such as 'Rear-Guard at White Oak Swamp' (1869-70), owned by Union League Club; 'Battle of Cedar Creek' (1871-2, at the state-house, Montpelier, Vt.); 'Battle of Golding's Farm' (1871); 'The Recall' (1872); 'On Board the Hartford' (1874); 'Duel of Burr and Hamilton' (1876); 'Reserves Awaiting Orders' (1877); 'In the Cornfield at Antietam' (1879); 'Charge at Petersburg' (1882); 'The War is Over' (1885); 'The Blue and the Gray' (1886); 'Death of Gen. Sedgwick,' in the Plainfield (N. J.) Public Library.

Scott, Michael, Scottish naval novelist: b. Glasgow 30 Oct. 1789; d. there 7 Nov. 1835. He was educated at the high-school and university of his native city and from 1806 till 1822 resided mostly in Jamaica, engaged in commerce and agriculture, but in the latter year he settled in Scotland, and embarked in commercial affairs. The two brilliant sea-novels of which he was the author appeared anonymously in 'Blackwood's Magazine.' 'Tom Cringle's Log' ran from September 1829 till August 1833, and 'The Cruise of the Midge' from March 1834 till June 1835. Both appeared for the first time in book form at Paris in 1836.

Scott, Nathan Bay, American politician: b. Ohio, 18 Dec. 1842. He was educated in the common schools of Quaker City, Ohio; served throughout the Civil War; and subsequently settled in Wheeling, W. Va. In 1880 he was president of the city council; state senator, 1882-90; commissioner of internal revenue, 1897-99; and since 1899 has represented his state in the United States Senate.

Scott, Thomas, English Anglican clergyman and Bible commentator: b. Baycroft, Lincolnshire, 4 Feb. 1747; d. Aston Sandford, Buckinghamshire, 16 April 1821. Possessing a strong love for learning he obtained a wide knowledge of both Latin and Greek, and in 1773 took orders in the Church of England. Through his friendship with John Newton he became an ardent Calvinist, defending Calvinism both in the pulpit and in the public press. He was chaplain of the Lock Chapel, London, in 1785-1801, and was then appointed rector of Aston Sandford, where he remained until his death. His reputation rests chiefly on his 'Commentary on the Bible' (1788-92), of which it is estimated that 100,000 copies have been sold. His other publications include: 'The Force of Truth' (1779); 'Remarks on the Bishop of Lincoln's Reiteration of Calvinism' (1812); etc. His collected 'Theological Works' were published (5 vols., 1805-8; 10 vols., 1823-5).

Scott, Thomas Alexander, American railroad manager: b. London, Pa., 28 Dec. 1824; d. Darby, Pa., 21 May 1881. He entered the service of the Pennsylvania Railroad in 1850; became its general superintendent in 1858, and its vice-president in 1859. His services as superintendent of all government railroads and telegraph lines at the beginning of the Civil War placed him in the ranks of men of extraordinary ability, from which he was appointed assistant secretary of war in August 1861. This post he resigned in the following June, but re-entered the government service later and achieved distinction in the rapid construction of railroad lines necessary to the relief of Gen. Rosecrans at Chattanooga. Again entering the service of the Pennsylvania Railroad, he inaugurated the policy of securing control of western railway lines for the purpose of operating them in conjunction with the Pennsylvania lines. From 1874-80 he was president of the Pennsylvania and at various times of other lines.

Scott, Sir Walter, Scotch poet and novelist: b. Edinburgh, 15 Aug. 1771; d. Abbotsford, 21 Sept. 1832. He was the ninth child of Walter Scott, a writer to the Signet (lawyer), who belonged to the strenuous Border clan of Buccleugh, and of Anne Rutherford, a representative of another famous family. There were 11 other children, six of whom died in infancy. Walter at the age of 18 months suffered from a teething fever which caused a permanent lameness of his right leg. On account of this he was early sent to the country, where he learned to love nature. Later he was taken to Bath and London, which impressed his imagination. At the age of seven he was entered at the high school in Edinburgh, where he displayed a love of sport and of good reading, though no great aptitude for hard, systematic study. For a short time he was at school at Kelso, where he formed his friendship with James Ballantyne. All accounts show that he was a manly, attractive boy who loved stories, poems like 'The Faerie Queene,' ballads, and family legends.

In November 1783 he entered the University of Edinburgh, where his course was impeded by illness and his desultory habits were not overcome. His knowledge of the classics was slight, but he learned something of the chief Romance literatures and, while riding or walking for his

health, he laid the foundations of his immense stock of antiquarian learning. In 1786 he was apprenticed to his father and, strength having come to him, he developed systematic habits of labor. He attended law lectures and debating clubs and in 1792 was called to the bar; but his interest in literature and history was no less than it had been, and he enjoyed the convivial society of his fellow law students. Despite his lameness, he was tall, strong, athletic, and manly in appearance, full of life and merriment, and attractive to both sexes. An early attachment to a pretty young woman was to be expected, but impediments presented themselves and Scott was left with memories which bore witness to what is thought to have been "the strongest passion of his life."

His early work at the bar did not interfere with his making excursions into the Highlands and along the Border, which added to his stock of ballads and legends and gave him an extraordinary insight into the character of his countrymen. The life with which he came in contact had its seamy side, especially with respect to intemperance, but his was a romantic temperament that was not to be contaminated. A new interest also came to him in 1792, when, with his friend William Erskine, he began to study German. A few years later he attempted a paraphrase of Bürger's 'Lenore,' which he was persuaded to print along with another imitation of a ballad by the same author. This led to an introduction to "Monk" Lewis (q.v.), who brought about the publication in 1799 of Scott's translation of Goethe's 'Goetz,' and persuaded his young friend to write some more ballads. Having thus had a taste of the pleasures of writing and publishing, though his success was far from dazzling, the young lawyer made plans to have his collection of ballads printed by his friend Ballantyne.

Meanwhile, his income from his profession had increased, and he had fallen in love with the attractive daughter of a French refugee, Charlotte Mary Carpenter (Charpentier). She had a small income settled on her, so that marriage did not seem a rash step. They took it in December 1797 and lived together congenially, although it does not appear that she was a specially qualified helpmate. In 1799 Scott was appointed Sheriff-depute of Selkirkshire with a salary of £300 and few duties. Soon after, he prosecuted with energy the task of editing and publishing his important 'Minstrelsy of the Scottish Border,' the first two volumes of which appeared in 1802, the third in 1803. This contained some imitations of the old ballads, but fortunately did not include a narrative poem on the legend of Gilpin Horner, that was at first intended for it. The excluded poem, written in the free measure of 'Christabel' which a friend had recited to Scott, was slowly elaborated into 'The Lay of the Last Minstrel,' which was published early in 1805 and achieved great success. Here the creative genius of Scott first manifested itself in marked powers of narration, characterization, and description, though scarcely in what may be called the strictly poetic gifts of high imagination, inevitable phrasing, and noble harmony.

He now determined to follow literature seriously, but also to secure a more definite income than could be had from that or from his not

specially brilliant work at the bar. With this end in view he undertook to perform the reportorial duties of an infirm clerk of session, who was to keep the emoluments of the office till his death or, as it turned out, until he was pensioned. Six years later (1812) Scott came into the comfortable salary of £1,300, but he had given much time to the clerkship and had done in addition work that would have worn out any less herculean constitution. He took some interest in politics, became a partner in Ballantyne's printing business, proposed publishing schemes, wrote articles and edited books, working early in the morning, took rides (especially when he was at his beautiful home of Ashiestiel near Selkirk), answered correspondents faithfully, and yet found time for reading and study. There is scarcely another such energetic and copious genius of a high order in several spheres to be found in the annals of English literature.

His most important creative works during this period were 'Marmion' (1808) and 'The Lady of the Lake' (1810), which increased his fame as a poet; but they represent only a small part of his labors. He edited 'Dryden' in 18 volumes (1808), prefixing an elaborate biography; he superintended a new edition of the 'Somers Tracts' in 13 volumes, to say nothing of about eight smaller undertakings of a similar kind; he helped to establish *The Quarterly Review*, and he formed an unlucky partnership with John Ballantyne, brother of James, to conduct a publishing business. If they could have confined themselves to publishing Scott's poetry, even after the unenthusiastic reception of 'Rokeby' (1813) showed Scott that he could not successfully rival Byron and that his own talents must be exercised in another sphere, the partners, despite John Ballantyne's unbusiness-like habits, might have made a passable success; but Scott thought himself a born promoter and literary adviser, and he was generous to a fault with authors who were his friends. Miss Seward's works, Beaumont and Fletcher's plays edited by Weber, *The Edinburgh Annual Register*, and other undertakings fell so flat that it seemed best in 1813 to wind up the publishing business.

These difficulties were tided over by loans and by the transfer of more or less worthless books to the publisher Archibald Constable, and the success of the "Waverley" novels for some years made Scott feel more confident of his financial position than a prudent man should have felt. His was, indeed, a glorious genius with a splendid energy to match, but he had also costly tastes which he aspired to gratify on a magnificent scale. His social position meant much more to him than his fame as a writer, and to maintain and increase that position he thought that he must acquire large estates and dispense a profuse hospitality. He began to realize his dream in 1812 when he bought the small farm of Abbotsford. Then he added one piece of land after another until he had spent about £30,000, he built himself a castle, and he lived on a scale which, in view of his tangled affairs, even his large income did not justify. It was only the discovery of his incomparable gifts for prose romance that postponed for so long his financial ruin.

Early in July 1814, just after the edition of



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Swift in 19 volumes marked the culmination of Scott's career as an editor though not as a critic, the romance 'Waverley, or 'tis Sixty Years Since,' an anonymous story dealing with the period of the Young Pretender, made its appearance and took the novel-reading world by something like a storm, six editions being needed before the close of the year. Scott had begun the tale as far back as 1805, the year of the 'Lay,' but Erskine and James Ballantyne, who wanted another well-paying poem, discouraged his attempt, and the easy-tempered author put it aside. In 1808 his attention was again directed to historical fiction through the fact that he undertook to prepare for the press an unfinished romance by the antiquary Joseph Strutt, entitled 'Queenhoo Hall.' He had always had a faculty for narrative and had enjoyed the tales and novels of others, especially, in recent years, the Irish stories of Miss Edgeworth (q.v.). We have already seen that the comparative waning of his poetic fame before that of Byron—illustrated by the failure of 'The Bridal of Triermain' (1813); which was anonymous, and to be confirmed later by the reception of 'The Lord of the Isles' (1815) and of 'Harold the Dauntless' (1817)—led him to think that he must transfer his energy to other fields, and he would probably have tried prose fiction again, sooner or later, even if a famous accident had not recalled his early attempt to his mind. One day at the end of 1813, while searching for some fishing tackle, he found the manuscript of his forgotten tale in a drawer. He read it over and determined to complete it. This time Erskine had the good sense to approve his friend's experiment, and Scott, writing with his phenomenal steadiness and rapidity, finished the last two-thirds of the book in three weeks. He did not put his name to it, partly for fear of losing some of his reputation if it failed, partly because novels were still looked upon in the main as an inferior form of literature in which a dignified officer like a clerk of session would not be expected to dabble.

Of course his fears proved to be ill-founded and there was no necessity for his preserving his anonymity, but he seems to have liked the mystery involved, and perhaps he thought that by remaining "The Great Unknown" he appeared to be less of a professional man of letters and in consequence more of a country gentleman of high standing. To this day there are people who cannot easily forgive Scott for his innocent deceptions and his failure to come out into the open as a proud representative of his art; but it is not difficult to understand him and it seems idle to be irritated with him. After all, he did not succeed thoroughly in his attempt to remain anonymous, for competent critics like John Wilson (q.v.) saw in the author of the novels the man who had written the poems and edited the ballads. The matter was enough discussed, however, to lead to the writing of J. L. Adolphus's "Letters" to Heber on the Waverley Novels and the question of their authorship (1821), but even after this unmasking Scott continued to wear his tenuous disguise for about six years.

'Waverley' was followed shortly by 'Guy Mannering,' which illustrated his genius as a painter of Scotch life and a revealer of Scotch

character—especially in the lower ranks of life. Like its predecessor it was dashed off, but was none the less immensely successful. Scott was delighted, particularly as money began to flow in and he was thus enabled to pay obligations and buy more land. He visited London and was over-encharmed at the flattering reception given him by the Prince Regent; but then Scott was a born Tory and consequently not likely to see the spots in a royal sun. His cordial relations with Byron were much more to his credit, especially as he championed that unfortunate poet when all England was crying out upon him. Later he visited Waterloo and met Wellington, who greatly impressed him. The literary results of this tour, 'Paul's Letters to His Kinsfolk' and 'The Field of Waterloo,' a poem, were failures; yet Scott was a great martial poet, would probably have been a soldier if he had not been lame, and could scarcely have had a more congenial subject. Fortunately no decline was visible in 'The Antiquary'; and in 'Old Mortality,' which came later in 1816, forming with 'The Black Dwarf' the first series of 'Tales of My Landlord,' Scott produced a story which in construction, characterization, historical imagination and sympathy, power of description and broad human interest, ranks deservedly, not only very high in the list of his own creations, but as one of the masterpieces of English fiction. The style is not flawless, the psychology is not penetrating, the art in general is less subtle and refined than that to which the novelists who have followed in Scott's wake have accustomed us; but in the essential points of wholesomeness and truth to nature and of large, copious, equable creative powers, Scott, as his influence upon other lands and generations plainly shows, has little reason to fear comparison with any of his successors.

At the close of 1817 'Rob Roy' followed, and six months later came 'The Heart of Midlothian,' which to many readers marks the culmination of Scott's genius as a novelist. The public responded heartily to every fresh appeal, but, unfortunately, Scott's popularity was used as a club to force publishers to take over the worthless stock of his publishing firm, and Scott and the Ballantynes were inextricably involved with Constable, who finally became Scott's sole publisher and dragged him down in his own failure. Meanwhile, the tragic 'Bride of Lammermoor,' which appealed so deeply to the sombre genius of Poe, and 'The Legend of Montrose' appeared in 1819, despite the fact that Scott had suffered tortures from a stomachic trouble. The heroic way in which he dictated the 'Bride' to Laidlaw and John Ballantyne is well known, as is also the fact that, when he got up from an illness which it was feared would prove fatal, he could not recall "a single incident, character, or conversation" in the story. Yet such was his pluck that he not only began a new book, but actually branched out into a new type of novel by crossing the border and throwing his scene back into a remote past. 'Ivanhoe,' for so this important venture was named, appeared at the close of 1819 and may be regarded, not as the best, but as the most popular of all Scott's works and as the one which made him a favorite and a great influence throughout Europe. The brilliance of its descriptions and the thrilling interest of

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its plot continue to atone for the carelessness of its construction and the untrustworthiness of its representation of the epoch in which its scene is laid.

Scott was now at the height of his literary and his social renown. In 1820 he accepted a baronetcy from George IV.—he had previously declined the Laureateship—and published 'The Monastery' and 'The Abbot.' The next year came the popular 'Kenilworth' and 'The Pirate,' followed in 1822 by 'The Fortunes of Nigel,' and in 1823 by 'Peveril of the Peak.' A stroke that seemed apoplectic did not affect the power of that masterly portrayal of the age of Louis XI., 'Quentin Durward' (1823), but 'St. Ronan's Well,' a novel of contemporary manners, has never been popular, a fate shared by 'Redgauntlet' (1824) and by the first of 'The Tales of the Crusaders' (1825)—'The Betrothed.' The companion of the last named, 'The Talisman,' revealed, however, the old Scott; but despite the merits of this and of 'Ivanhoe' and 'Kenilworth' and the greatness of 'Quentin Durward,' the novels of this second period do not deserve to rank with those of the first. The stories of his period of financial ruin, 'Woodstock' (1826), 'The Fair Maid of Perth' (1828), 'Anne of Geierstein' (1829), were the work of a still vigorous and an even more heroic man; those of his complete physical breakdown, 'Count Robert of Paris' and 'Castle Dangerous' (1831), call for no criticism.

Meanwhile, the crash had come. Scott, confident in his powers, had not narrowly scrutinized his relations with the Ballantynes and Constable and, in his mania for lands and buildings and lavish hospitality, he had raised money on Constable's notes given for novels yet unwritten. A general period of depression came on and Constable failed in January 1826, bringing down with him the firm of James Ballantyne & Co., of which Scott was a partner. The result was that as Ballantyne was practically without resources, Scott felt bound in honor to pay off alone a debt of nearly £120,000. How he set to work on 'Woodstock,' how he refused all offers of help, how he made in two years, especially through his 'Life of Napoleon Buonaparte' (1827), the enormous sum of £40,000, how he bore the loss of his wife (1826) and his own infirmities, how he turned his pen to every possible task of profit—'Tales of a Grandfather' (1829) combined pleasure with profit,—how he wrote admirable prefaces for a new edition of his novels—all this is familiar to the reader of Lockhart.

Early in 1830 he had a paralytic stroke and after that his efforts to save Abbotsford, where his creditors let him continue to reside, as the seat of the family he had so longed to establish, became truly pathetic. In April 1831 he had a still more serious stroke and a little later he suffered perhaps even more acutely from the rude treatment he received from the mob at Jedburgh, where he had gone to protest against the proposed reform of Parliament. A born conservative and ever a true child of the past, it was time for him to say good-bye to a world that was entering upon a series of rapid and far-reaching changes. After his last novel had been published, it seemed that he ought to try a milder climate in order to prolong his life. The government offered him the use of a frigate;

and, after a notable parting with Wordsworth, he set out for Plymouth to take it. He visited Malta, Naples, and Rome, then the Tyrol and the Rhine region. At Nimuegen, on 9 June 1832, he was severely stricken and was shortly after brought home to Abbotsford, where, on the afternoon of 21 Sept. 1832, he died, surrounded by his children.

He had been what, in his last words, he told Lockhart to be—a good man. His foibles and faults—we cannot lay the whole blame for his misfortunes on the Ballantynes and Constable—when they were not those of his class and his age, were such as detracted little from the greatness of his character, and much the same thing may be said of his defects as a writer. There have been few nobler spirits in the world's history; nor is it clear that since Milton's day a more illustrious, or take him all in all, a greater writer has been born within the lands that use the English tongue. Abbotsford yields only to Stratford as a literary shrine, but it is an ironical comment on Scott's labors to aggrandize his family that no direct male heir should welcome pilgrims to it.

Bibliography.—The standard editions of Scott's poems and novels are those in 11 and 48 volumes with his prefaces (1829-1833). The miscellaneous works fill 28 volumes in the edition of 1834-36. Of the numerous later editions mention may be made of the "Cambridge Edition" of the poems edited by H. E. Scudder (1 vol.) and of the "Border Edition" of the novels (48 vols., 1892-4) with excellent introductions, by Andrew Lang. The chief authority for Scott's life is his son-in-law, J. G. Lockhart's (q.v.) admirable biography (7 vols., 1837, but best read in the Cambridge Edition, Boston, 1902). There are short lives by R. H. Hutton ('English Men of Letters'), C. D. Yonge ('Great Writers'—with a bibliography), W. H. Hudson (1901), Lang, 'Literary Lives' (1906) Saintsbury ('Famous Scots', 1897) and others. Attention should also be given to Scott's last 'Journals' (1890) and his 'Familiar Letters' (1894) edited by David Douglas. For criticism consult Lang's biography and introductions; F. T. Palgrave's introduction to the "Globe" edition of the poems; Leslie Stephen, 'Studies of a Biographer' (Vol. II., 1898) and 'Hours in a Library' (Vol. I.); Ruskin, 'Fors Clavigera' and the histories of English literature. A volume on Scott as a critic, a little treated subject, by Margaret E. Ball, is in the press (1907).

WILLIAM P. TRENT,
Professor of English Literature, Columbia University.

Scott, William Amasa, American political economist: b. Clarkson, Monroe County, N. Y., 17 April 1862. He was graduated from the University of Rochester in 1886, was professor of history and political science in the University of South Dakota 1887-90; assistant professor of political economy in the University of Wisconsin 1892-3; associate professor there 1892-7, and professor 1897-1900. Since the date last named he has been director of the school of commerce and professor of economic history and theory in that institution. He has published 'Repudiation of State Debts' (1893); 'Money and Banking' (1903).



Painted by J. B. Stebbins

Winfield Scott

1796-1876

SCOTT — SCOTT-GATTY

Scott, William Bell, Scottish poet and painter, brother of David Scott (q.v.): b. Edinburgh 12 Sept. 1811; d. Perthshire 22 Nov. 1890. He received his first education in art from his father, who was an engraver, and in 1834 began to write poetry for the current magazines. His first picture of note, 'The Old English Ballad Singer,' was exhibited in 1838. From this time forward his reputation as a painter was established. He is best remembered, however, as a poet. While for many years he was an exhibitor in the Royal Academy, his greatest activity was along literary lines. His most noted poetical works are: 'The Year of the World' (1846); 'Poems by a Painter' (1854); and Ballads, etc. (1875). His other writings include: 'Lectures on Art' (1861); 'Albert Durer: His Life and Works' (1869); 'The Little Masters' (1879); 'Life and Works of David Scott.'

Scott, Winfield, American soldier: b. near Petersburg, Dinwiddie County, Va., 13 June 1786; d. West Point, N. Y., 29 May 1866. After study at William and Mary College in 1805, he read law at Petersburg, and, having obtained his license, rode the circuit and was retained in several causes. In 1808 he obtained a captain's commission in the United States army, and in 1809 embarked with his company from Norfolk to New Orleans. On 18 June 1812 war was declared by Congress against Great Britain (see WAR of 1812). On 6 July following Scott was commissioned the lieutenant-colonel of the 2d artillery. He at once was ordered to mobilize his regiment at Philadelphia and soon after, at his request, to proceed to the Canadian frontier. He arrived at the headquarters of Brigadier-General Alexander Smyth (q.v.) 4 October. The affair at Queenstown took place on 13 October. Scott did not take part in the successful attack on the heights, but commanded the American forces in the ensuing battle, and after brisk fighting was obliged to surrender to much superior numbers. He was soon after exchanged, in March 1813, was appointed adjutant-general with rank of colonel, and at about the same time was promoted colonel of his regiment. With the regiment he joined General Dearborn on the Niagara frontier, became Dearborn's chief of staff, led the successful attack on Fort George 27 May, commanded the rear guard in the retreat from Stony Creek to Fort George, and co-operated with the naval forces in the descent on Burlington Heights and York. Promoted 9 March 1814 to be brigadier-general, he established a camp of instruction at Buffalo. Scott's brigade and Ripley's crossed the Niagara 3 July 1814; Fort Erie was invested and captured; and on the 4th Scott moved toward Chippewa. On 5 July occurred the battle of Chippewa (q.v.). Scott greatly distinguished himself, and General Brown, commanding, declared that to Scott more than any other the American victory was due. The battle of Lundy's Lane (q.v.) followed on the 25th, where Scott again displayed great ability. These battles, both won chiefly by Scott, fully established American military prestige. For his services, Scott received a gold medal from Congress, and was made brevet major-general (from 25 July). He declined to act as secretary of war, and was in Europe in 1815-16. In 1826 he was made president of a

board of army and militia officers convened at Washington for the consideration of various military questions, and in 1829 was assigned to the command of the Department of the East. In July 1832 he was ordered to Illinois to take command of the forces in the Black Hawk war (see BLACK HAWK), and left Buffalo for Chicago with 1,000 troops. He was not in the active campaign, but co-operated with Governor Reynolds of Illinois in concluding treaties with the Sacs, Foxes, Winnebagoes, Sioux, and Menominees. At the time of the nullification troubles he was sent to South Carolina (1831-2), where he was successful in averting civil war. He prosecuted the Seminole and Creek campaigns in Florida (1836), and superintended the removal of the Cherokees from Georgia to their reservation west of the Mississippi. On 25 June 1841 he became major-general and general-in-chief of the army. In 1839 at the Whig convention at Harrisburg, Pa., Scott was presented as a candidate for the Presidency, though he urged Clay as first, Harrison as second, choice, and the 62 votes cast for him went ultimately to Harrison. He was ordered on 23 Nov. 1846 to Mexico to take charge of the forces there. He assembled his troops at Lobos Island, moved transports in February, landed at Vera Cruz 9 March, and effected its surrender 29 March. From this time he proceeded on the uniformly victorious campaign which practically closed the war by his entry into the City of Mexico on 14 September. (For complete account see MEXICAN WAR and articles on various battles.) At the close of the war Scott relinquished the command to Gen. W. O. Butler, and returned to the United States, where he received a gold medal from Congress, and was a candidate in 1848 in the Whig convention which nominated Taylor for the Presidency. In 1852 he was defeated by Franklin Pierce, and in 1855 made brevet lieutenant-general. In 1859, when the American and British governments were adjusting the northwestern boundary question, he was sent to Puget Sound to adjust the difficulties caused by the precipitate occupation of San Juan Island. At the outbreak of the Civil War, he took command at Washington 12 Dec. 1860, provided for the safety of the national capital, and the organization of the army, but resigned the command to McClellan 1 Nov. 1861. Scott was a strict disciplinarian and this, with his formality, led to his army nickname of "Old Fuss and Feathers." As to his skill as a military leader there can be no question. He gained notable distinction in two wars. Webster, in a Senate speech (20 Feb. 1848) called the Mexican War "the most brilliant campaign on recent military record," and Grant writes of the faultless strategy at Churubusco. His political defeats in no way detracted from his reputation. He published 'General Regulations for the Army' (1825), and 'Infantry Tactics' (1835). Consult biographies by Mansfield (1846); Headley (1852); Victor (1861), and Wright (1894); Scott's 'Memoirs' (1864); Townsend, 'Anecdotes of the Civil War' (1884); Wilcox, 'History of the Mexican War' (1892).

Scott-Gatty, skõt'gät'i, **Alfred Scott**, English composer: b. Ecclesfield Vicarage, Yorkshire, 26 April 1847. He was educated at Christ's College, Cambridge, began to write

SCOTSDALE—SCOTUS ERIGENA

music at an early age, and at 21 published the first of his children's songs. He has written a number of song books for children. His best known compositions are: 'Little Songs for Little Voices'; 'Musical Plays for Children'; 'The Goose Girl,' and 'The Three Bears.' He is the son of the well known writer, Rev. Alfred Gatty, and a brother of Mrs. Ewing, author of 'Jackanapes.'

Scottdale, skōt'dāl, Pa., borough in Westmoreland County; on the Baltimore & O., and the Pennsylvania R.R.'s; about 30 miles in direct line southeast of Pittsburg and 16 miles south of Greensburg, the county-seat. It is in an agricultural and coal mining region, and it has considerable manufacturing interests. The chief manufacturing establishments are large pipe-works, rolling mill, foundry, machine shops, and steel works. The coal mines of the vicinity contribute to the prosperity of the borough. The two banks have a combined capital of \$100,000. The principal buildings are the churches and schools. The educational institutions are a high school, public and parish elementary schools, a private school, and a public library. Pop. (1890) 2,693; (1900) 4,261; (1910) 5,456.

Scottish Chiefs, The, a romance by Jane Porter, published in 1810. It is still popular, and historically correct in all important points. The narrative opens with the year 1296.

Scottish Clans, Order of (American), an organization with 4,000 members, having its headquarters in Boston, Mass. It is a fraternal and benevolent order, having in 1903 a total income of \$85,214. In the same year it paid out claims to the amount of \$67,000.

Scottish Philosophy, School of, the school of philosophy founded by Thomas Reid, whose aim was to disprove the skeptical conclusions of Hume, which had obtained a wide vogue in Great Britain and on the Continent. Reid, who was born in Kincardineshire, Scotland, 26 April 1710, and died in 1796, insisted upon certain principles as everywhere present in experience, and he appealed to human consciousness and intelligence against what he called "the ideal theory." The resemblance of Reid's philosophy to Kant's vindication of the categories as elements necessary to the constitution of the simplest experience is obvious. Reid and his successors cannot be said to have produced a system, but they started many others in a train of thought that led to valuable philosophical observations, and the 'Scottish School of Philosophy proved no insignificant breakwater to the tide of skepticism which rose so high in the 18th century. Besides Reid, the most noted representatives of the Scottish Philosophy were Dugald Stewart (1753-1828), Sir William Hamilton (1788-1856), W. Whewell, master of Trinity College, Cambridge (1794-1866), Henry Calderwood (1830-98), and J. Campbell Fraser (still living). James McCosh (president of Princeton University from 1868 to 1888) and Noah Porter (president of Yale University from 1871 to 1886) belonged to the same school, and as teachers of philosophy contributed largely to its influence in this country. Consult McCosh, 'The Scottish Philosophy.'

Scotus, skō'tūs, John Duns, Franciscan friar, one of the great lights of the mediæval

scholastic philosophy and theology. The years 1265 and 1275 are variously assigned for his birth; he died at Cologne 8 Nov. 1308. His cognomen Scotus plainly betokens his Gaelic origin, whether Irish or Scotch; his surname Duns may be derived from Dunum (Downpatrick, a town in Ulster), or from Dunse, a town in North Britain, or from Dunstane, a village in Northumberland: these three derivations have each its strenuous advocate. The chief advocate on behalf of Ireland is Luke Wadding (1588-1657), Franciscan friar, historian of the Franciscan order (*Annales*, in 8 vols. fol.), and author of many other works, editor also of the complete works of Duns Scotus (12 vols. fol.); on behalf of North Britain, Thomas Dempster (1579-1625), also a man of great learning, indeed, "one of the most learned men whom Scotland has produced," author of many books, among them a quarto volume designed to prove Duns Scotus a Scotchman; and on behalf of England the celebrated antiquary John Leland (1506-52), *et adhuc sub iudice lis est*. Duns Scotus certainly entered the order of Franciscan friars early in life, studied at Merton College, Oxford, and became a fellow of the same. He was an earnest and most ingenious champion of the doctrine of the Immaculate Conception against the opposite teaching of the rival order of Dominicans. His place as theologian and philosopher was and is of the highest. See SCHOLASTICISM.

Scotus Erigena, ē-rīj'ē-nā, Johannes, Christian philosopher of the Carolingian period. Everything concerning the place or date of his birth is conjectural. It has been divined from his name that he was of Scottish race, and Irish birthplace. He was probably born between 810 and 815. He is said by some apocryphal authorities to have traveled in Greece, Asia, Egypt, Italy and France. But his first actual appearance in history is in the court of Charles the Bald who was himself devoted to letters. He was induced by this monarch to translate the treatise 'On the Heavenly Hierarchy,' the work of the pseudo-Dionysius the Areopagite. The attention of Hinemar, archbishop of Rheims, was attracted by the fame of Erigena who wrote at that prelate's request his work on 'Predestination.' 'The Heavenly Hierarchy' was a work which had a great deal of influence in development of mysticism (q.v.) in France. Pope Nicholas in 867 complained to Charles the Bald that such works as this version of the Neo-Platonists work were of doubtful tendency; it is not known what reply he received, but after that date Erigena drops out of the light of history.

Johannes Scotus Erigena translated all the works of the supposed Areopagite, he also composed a treatise on the Eucharist in which he denied the real presence. His philosophical views were set forth in his 'Divisions of Nature' which caused him to be charged with pantheism; and modern historians of philosophy have looked upon him as the precursor of Spinoza. It is certain that 400 years later (1225) Pope Honorius III., during the Albigensian crusades, condemned the book and ordered it to be burned publicly. Consult: Hjört, 'Johann Scotus Erigena' (1823); Guizot, 'Histoire de la Civilisation en France'; Milman, 'History of the Latin Church.'

SCOURGE OF GOD—SCRANTON

Scourge of God, The. See **ATTILA**.

Scouring-Rush. See **DUTCH RUSHES**; **RUSH**.

Sco'el, Sylvester, American journalist and engineer: b. Denny Station, Pa., 29 July 1869; d. Havana, Cuba, 11 Feb. 1905. He was educated at the University of Michigan and in 1895 went to Cuba as war correspondent. He broke through the Spanish police and military lines 30 times, was twice captured, once making his escape, and on the second occasion in 1897 was released at the request of the United States government. He was subsequently correspondent in the Turko-Greco War, in Spain, and in the Klondike, and returned to Havana just before the destruction of the Maine in 1898. He was with the army and navy until the surrender of Santiago and after that was engaged in the promotion of various Cuban enterprises. In 1899-1902 he was consulting engineer for the United States military government Cuban customs service.

Scranton, skrā'n'ton, Miss., town, county-seat of Jackson County; on the Pascagoula River, near the Gulf of Mexico, and on the Louisville & Nashville railroad; about 48 miles southwest of Mobile, Ala. It is in a lumbering region, and the town is known also for its extensive fisheries, especially the oyster industry. The chief industries are connected with the manufacturing and shipping of pine lumber, and, in the season, with the canning and shipping of oysters. The state bank has a capital of \$25,000. Pop. (1910) 2,190.

Scranton, Pa., city and county-seat of Lackawanna County, is (1904) the fourth in size in the State and 38th in population in the United States. It is 162 miles from Philadelphia, northerly, and 142 from New York, westerly; and a central point on the Delaware, Lackawanna & Western Railroad. It is also entered by the Central Railroad of New Jersey, branches of the Delaware & Hudson, the Erie, and the New York, Ontario & Western Railroads. The Lackawanna & Wyoming Valley Railroad (Laurel Line), of new and costly construction and operated by electricity, is another connecting link south and eastward. Built on both sides of the Lackawanna River, which merges into the Susquehanna River some eight miles to the southward, the city is pleasantly situated on an undulating plateau in the Lackawanna Valley, at a mean altitude of between 700 and 800 feet above sea-level. Mountain ranges on either side attain an elevation of from 1,000 to 1,200 feet more. Laid out with wide streets and avenues, it has also many driveways, a court house square, and three parks. Among the prominent public buildings in Scranton are the post-office, court-house, municipal building, public library (Albright Memorial), 13th Regiment Armory, and the Moses Taylor Hospital. There are three other general and two private hospitals, a Y. M. C. A. building (erected in 1903 at a cost of over \$250,000), three theatres, numerous public and private schools, and churches of all denominations; many of the church and school buildings being large and costly.

Industries.—Scranton is the centre of the chief anthracite coal district of the United States, and has many large collieries within its limits. Prior to its development in coal mining, a blast furnace was first erected here in

1840, and was soon followed by a rolling and rail mills. Subsequently other important establishments working in iron, but less extensively, became well known producers of mining machinery and other tools, and of steam boilers, locomotives, car wheels, wagon axles, stoves, grates, nuts and bolts, railway spikes, and the like. For reasons of an economic nature the rolling and rail mills have in later years been taken elsewhere, but the other industries continue in active operation; and still more diversified ones have been introduced, manufacturing articles of various materials, including silk and silk goods, under and outer wear, buttons, lace curtains, pianos, pumps, etc. Steam heating by the district plan is supplied on a large scale to the business and many residential sections, by a private company. In addition to much Scranton capital invested in all parts of the country, other local interests are cared for by 14 banking institutions, and sundry building and loan associations. Local newspapers, four daily and eight weekly, and numerous monthly and other publications are regularly issued.

History.—This locality was originally settled from 1788 to 1800. Early in the century it was called Slocum Hollow, after the Slocum family then prominent in its affairs. More active development took place from the year 1840 and onward, largely through the initiative of Col. George W. and Selden T. Scranton, and associates. In honor of the former it was then named, and has since been known as Scranton. It was incorporated as a borough in 1856, and as a city in 1866.

Government and Social Life.—The city is governed by a mayor and two city councils, elected by popular ballot. Social life of Scranton is evinced in numerous associations, clubs, and lodges of all kinds; while many and effective public and semi-public charities are also well supported by the citizens.

Statistics.—The municipal area is practically 20 square miles, divided into 21 wards. There are 165 miles of streets, avenues, and courts, of which 22 miles are paved; and the sewer system measures 65 miles. Public lighting is by electricity, at a cost of nearly \$60,000 per annum; the police department costs annually not less than \$65,000, and the fire department \$75,000. The school enrolment exceeds 18,000 pupils, and annual expenditures for public education are more than \$600,000. The largest and best known correspondence school in the world, and some others, had their origin and are in operation in Scranton. Assessed property valuation in 1903 aggregated close to \$64,000,000. Average annual death rate is less than 16 per thousand, being reported as but 14.33 for the year 1903. Scranton is one of the few large cities in the United States having an almost unlimited water supply, though not controlled by the city. The water is soft and pure, impounded from mountain streams and a large, well-protected watershed. It is delivered by gravity from several reservoirs and a large artificial lake. The daily water consumption is nearly or quite 25,000,000 gallons, while an average of about 5,000,000,000 gallons is kept in store the major part of the year. Census reports of its population are as follows: (1860) 9,223; (1870) 35,092; (1880) 45,850; (1890)

75,215; (1900) 102,026. Census of 1910 gives the city 129,867.

HENRY J. CARR,

Librarian Scranton Public Library.

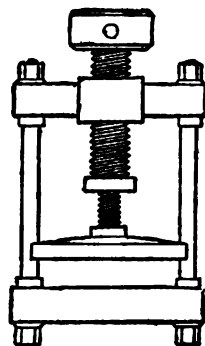
Screamers, the name given to two or three genera of birds, forming the family *Palamedeidae*. In the genus *Palamedea* the nostrils are oval, the head possesses a slender frontal horn more than three inches long; the wings each bear two sharp shoulder spines with bony cores, and the long toes are covered with square scales above. To this genus belongs the horned screamer (*P. cornuta*), of the Amazon Valley and Guiana, which inhabits hot morasses and swamps. This bird equals a turkey in size. The voice is shrill and loud and the birds scream in concert. The plumage is a blackish-brown above, the head and neck having the feathers marked with white.

The genus *Chauna*, of which the chaja or crested screamer (*C. chavaria*) is the representative, has the tip of the bill hooked. No horn exists on the head. The name "chaja" is given to this species from the sound of its cry. It occurs in Brazil and Paraguay. It is of solitary habits. The wings possess, as in the former case, two spurs each. The color is a bluish-gray marked with black, the neck being encircled by a black collar, whilst a tuft of feathers on the head constitutes a crest. Round the eyes the skin is naked, and of a red color. The food consists chiefly of plants, and the flight is strong. The eggs are two in number. A third form (*Ischyromis derbiana*), closely related to the last, inhabits Central America. A remarkable feature of all of these birds is the great development of subcutaneous air-sacs, like a thick layer of bubbles beneath the skin, which make a crackling sound when pressed. Although galline in appearance and general habits these birds are more closely related to the ducks and geese.

Screen, in ecclesiastical architecture, a partition of stone, wood, or metal to separate different parts of the building; as, the nave or an aisle from the choir, or a private chapel from the transept. The term is also applied to a partition extending across the lower end of a mediæval hall, forming a lobby within the main entrance doors, and having often a gallery above; also to a decorated wall enclosing a courtyard in front of a building.

Screw, a wooden or metal cylinder having a spiral ridge (the thread) winding round it in a uniform manner, so that the successive turns are all exactly the same distance from each other, and a corresponding spiral groove is produced. The screw forms one of the six mechanical powers, and is simply a modification of the inclined plane. The energy is transmitted by means of a hollow cylinder (the female screw) of equal diameter with the solid one (the male screw), having a spiral channel cut on its inner surface so as to correspond exactly to the spiral ridge raised upon the solid cylinder. Hence the one will work within the other, and by turning the convex cylinder, while the other remains fixed, the former will pass through the latter, and will advance every revolution through a space equal to the distance between two contiguous turns of the thread. As the screw is a modification of the inclined plane it is not difficult to estimate the mechanical advantage obtained by it. If we

suppose the power to be applied to the circumference of the screw, and to act in a direction at right angles to the radius of the cylinder, and parallel to the base of the inclined plane by which the screw is supposed to be formed, then the power will be to the resistance as the distance between two contiguous threads to the circumference of the cylinder. But as in practice the screw is combined with the lever, and the power applied to the extremity of the lever, the law becomes: The power is to the resistance as the distance between two contiguous threads to the circumference described by the power. Hence the mechanical effect of the screw is increased by lessening the distance between the threads or making them finer, or by lengthening the lever to which the power is applied. The law, however, is greatly modified by the friction, which is very great. The uses of the screw are various.



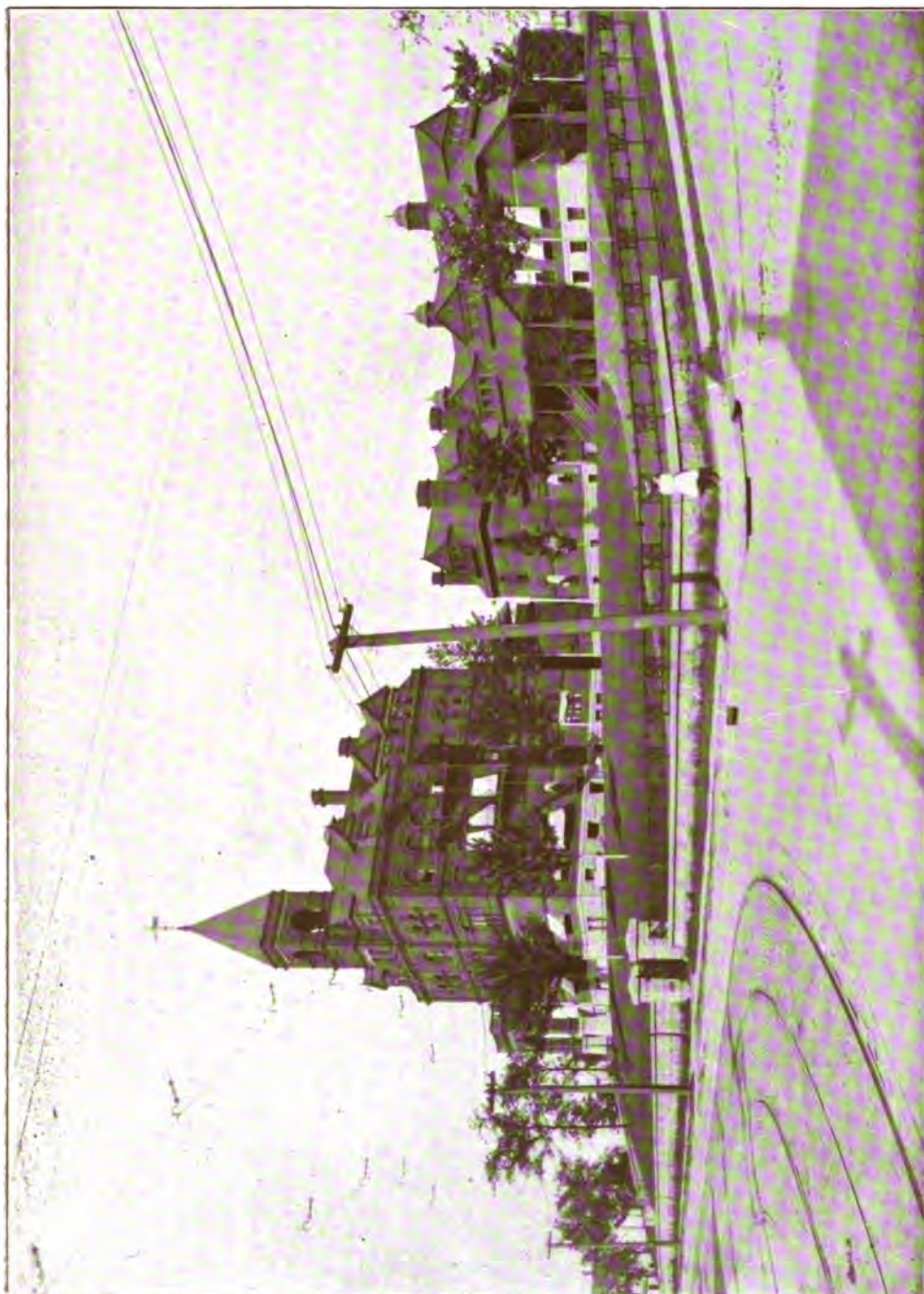
Hunter's Screw-press.

It is an invaluable contrivance for fine adjustments such as are required in fine telescopes, microscopes, micrometers, etc. It is used for the application of great pressure as in the screw-jack and screw-press; as a borer in the gimlet; and in the ordinary screw-nail we have it employed for fastening separate pieces of material together. The *differential screw*, or *Hunter's screw*, is formed of two screws, a larger and a smaller, the former being screwed internally to allow the latter to screw into it; the pitch of the two screws differs slightly, and for each turn of the chief or larger screw the progress of the point of the compound screw is the difference of pitch. Great power is in this way attained without the weakness due to a screw with fine threads. See also SCREW-PROPELLER.

Screw Nails, or as they are called in the trade "wood screws," are made from mild steel and iron; or from brass, copper, and zinc, when others would be destroyed by rust. Wood screws were in use long before the year 1760, when the brothers Wyatt obtained a patent for cutting screws by machinery. Before 1817, wood screws, being nearly all forged and then shaped by hand, were very expensive. In the year 1854 a greatly improved machine was invented in the United States, which revolutionized screw making.

Screw-pine, a popular name for species of *Pandanus*, order *Pandanaceæ*. The species, of which more than 50 have been described, are natives of the tropics, and are especially numerous in the Australasian Archipelago. They are mostly trees or shrubs with slender or stout trunks, frequently with aerial roots. Each naked branch is terminated by a tuft of long sword-shaped spiny edged leaves. In tropical countries *P. utilis* is highly valued for its edible fruits, and the fibres of its roots and leaves. The leaves of *P. odoratissimus* also yield a valuable fibre (q.v.). The former species, which has green leaves, and *P. veitchii*, which has variegated

SCRANTON.



THE MOSES TAYLOR HOSPITAL

SCREW PROPELLER

foliage, are widely popular in greenhouses, being easy to rear, fairly rapid in growth, and striking in appearance. The name screw-pine is suggested by the perfect spiral arrangement of the leaves easily observed in mature specimens, and also from their resemblance to the pine-apple.

Screw Propeller, a mechanical device embodying the principle of the screw, employed to propel various kinds of marine craft—ocean steamships, warships, tug-boats, etc. It consists of a cylindrical or spherical hub or boss to which two or more blades are attached with bolts, and forms the screw which acts in the water like a screw bolt in a nut, and the rapid rotation of which around its axis pushes the vessel forward.

It is the most modern method of ship propulsion, and although known to waste at least 40 per cent of the power delivered to it by the driving engines, it has almost completely superseded the paddlewheel for that purpose, and confined the application of the latter to river steamers and other shallow or light draft craft.

Although known in principle to the ancients, and suggested in France by Bernouille in 1752, and by Dallery in 1803, the credit for its modern re-invention and practical application appears to belong to Ressel, the Austrian inventor, who took out a patent for it in 1812, and used it practically on the steamer *Civetta*, in 1829. The idea was further developed by Sauvage in 1832, and a few years later in England, by Smith and Ericsson. Smith's modification—the reduction in the number of blades, was suggested by an accident which broke off the backward blade of one of his propellers, and resulted in a suddenly accelerated motion of the vessel.

In America, Evans and Fitch experimented with screw propellers in 1780 and 1790, and Stevens successfully operated a steamboat equipped with a screw propeller, in 1802, but it was most practically developed and applied by Ericsson in 1839, in connection with the United States steamer "*Princeton*" which was the first screw propelled war vessel ever built in any country. She was built through the recommendation of Commodore Stockton, under Ericsson's personal superintendence. She had a tonnage of about a thousand tons, and was the first war vessel in which the machinery was entirely below the water-line, and her unqualified success not only demonstrated the particular value of the screw for vessels of war, but quickly led to its general application to those of the merchant service as well, before the close of the year 1870.

Each blade of a screw propeller may be considered as the small portion of a complete screw-thread of great pitch, and considerable depth relative to the pitch. The pitch of a propeller is the distance through which it moves in one revolution, assuming that the water in which it turns is a solid medium. There are two general types—(1) those in which the blades are plain warped surfaces, and the pitch is constant at all points, that is, the generating line of every blade keeps the same angle with the boss, and (2) those in which the blades are curved and bent in various ways, and the pitch is variable at different parts of the blades. Many different screws of this type, with variable or increasing pitch, have been designed in the

attempt to produce a form that would reduce to a minimum the loss of applied power due to the rotary motion of the screw which forces the water away radially, and the loss due to the friction of the blades. In the earlier forms, in which the boss was of small diameter—about twice that of the shaft—the increasing angle of the blade surfaces, as they approached the axis, placed them at the boss in a position parallel to the keel, so that the central portion of the screw gave very little propulsive efficiency—a great deal of the power being used up merely in churning and agitating the water. Another cause that wasted a great deal of energy was the number and length of the blades, and their great width at the ends, all of which absorbed power by surface friction.

To obviate these faults, Griffiths substituted for the central portion a large spherical boss, one third the diameter of the whole propeller, which revolved smoothly in the water. He also diminished the width of the blades, and attached them to the boss in such a manner that they could be turned upon their axes and thus given various inclinations according to the speed intended for the ship. In the latest types of propellers, the diameter of the boss varies from one fifth to one third of that of the whole screw; while the diameter of the whole screw depends upon the speed required, the character of the driving machinery, the form of the ship, and many other conditions for which only approximate rules can be given. It is interesting and valuable to note in this connection, that upon the basis of the data derived from the actual tests of a great variety of screw propellers, it is safe to state that the exact effect due to the form of their blades has not as yet been definitely determined, and that the shape of the hull of the vessel is by far the most controlling factor in determining the question of speed. Another factor which adds greatly to the loss of applied power is the "slip" resulting from the working of the screw in a yielding or fluid medium, and therefore requiring a greater number of revolutions to travel a given distance than would be required if it worked in a solid medium. Slip is a factor which adds greatly to the waste of applied power in all forms of propellers—sails, oars, paddlewheels, etc. In the

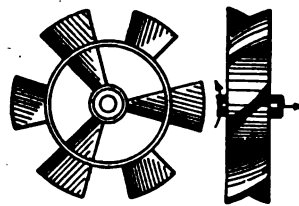


FIG. 1,
Ressel — 1812.

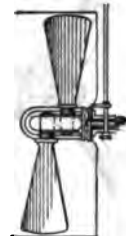


FIG. 2,
Ressel — improved

case of the screw propeller, the difference between the distance travelled by the screw in a fluid, and the interval of its advance in a solid medium is known as the "apparent slip"; while the backward velocity of the water immediately acted upon by the screw, is called the "real slip". Both of these results are consequences necessitated by the working of a screw in a

SCREW PROPELLER

fluid medium, and may under certain circumstances vary considerably from each other. Real slip may be expressed by the formula $\frac{v + f - s}{v}$,

in which (v) represents the speed of the screw, (s) the speed of the vessel, and (f) the velocity of the forward motion of the water following in the wake of the vessel. The factor (f), being due to the frictional resistance of the vessel, depends so much upon the shape of its hull, that it is not susceptible of accurate determination, so that in considering the loss of applied

brations than the other forms. As previously stated, however, the most important element affecting the propulsive efficiency of a screw propeller is the form of the vessel. For low speeds, bluff bows and full sterns give results equally as good as sharp bows and lean sterns with a long hollow run; while on the other hand the last named qualifications give a form that allows the waves of replacement to flow in solidity to, the propeller, and is the most appropriate for high speeds.

Figs. 1 to 8 show a few of the 150 forms of screw propellers, designed at different periods, and illustrate in a general way its development from the primitive form designed by Ressel in 1812. All of those used at the present time, however, are modifications of the Griffiths, Thornycroft, and Jarrow types. They are made of iron, steel, or bronze, and the blades are cast solid with the boss, or made separate and bolted or attached to it in various ways. A screw propeller when in position is secured to the end of the shaft of iron or steel called the propeller or tail shaft, which is connected to the line shafting attached to the crank shaft of the driving engine. The push or thrust of the screw, which is equivalent to the resistance of the hull, and amounts to about 20,000 pounds per 1,000 horse-power, is received on a thrust bear-

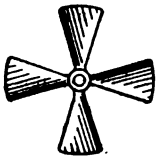


FIG. 3.
Ericsson — 1835.

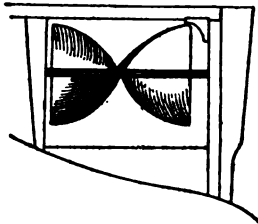


FIG. 4.
Maudslay — 1848.



FIG. 5.
Hirsch — 1860.

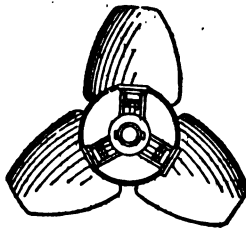


FIG. 6.
Griffiths — 1865.

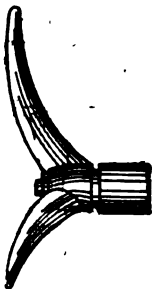


FIG. 7.
Jarrow — 1880.

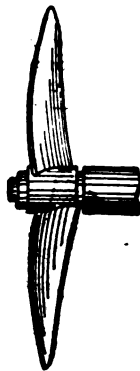


FIG. 8.
Thornycroft — 1885.

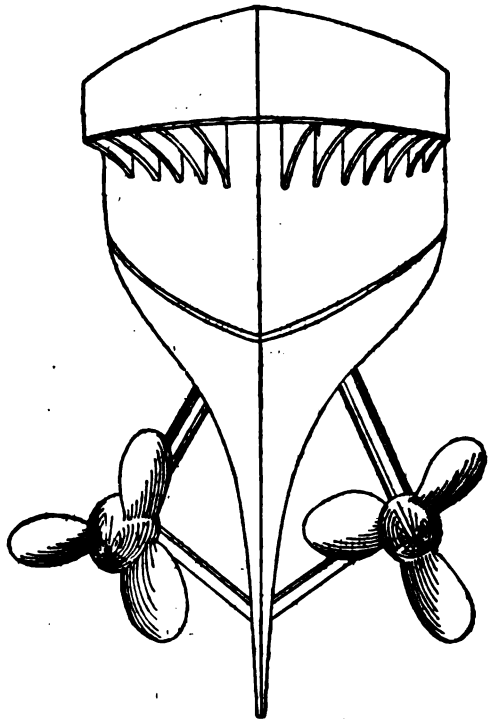


FIG. 9.—Twin Propellers, U. S. S. New York.

power in this connection, the result ordinarily referred to is the apparent slip.

The efficiency of different forms of propellers differs but slightly so long as their pitch, and their blade areas are designed correctly to suit the conditions for which they are employed. In general, the four-bladed propellers are the most efficient, and are freer from vi-

ing provided with a series of collars and grooves which fit similar ones on the shaft. Small vessels, and those designed for slow speed, are usually equipped with single screws; but for large high speed vessels, twin screws placed horizontally at right angles to the keel, one on each side of the stern post, are the most efficient. Some vessels have been fitted with three screws.

SCREW-WORM FLY — SCRIBNER

but the amount of additional efficiency derived from the arrangement is a very doubtful quantity. On the other hand, high powered vessels equipped with turbine engines employ multiple screws, the engines operating two, three, or more shafts carrying three screws each, with the advantage of dividing the work of generating the enormous power required by large modern ships, among several small engines instead of one large ponderous machine, thus reducing to a minimum the difficulties and dangers incident to breakdowns. Sailing vessels using steam only as an auxiliary power are equipped with "feathering" screws, the blades of which can be closed together in a line parallel with the keel, and thus prevent them from acting as a drag when the vessel is propelled by the sails alone.

Fig. 9 shows the stern of the United States cruiser New York with twin screws in position.

Bibliography.—For further detailed information consult: Barnaby, 'Marine Propellers' (London and New York 1891); Bennet, 'The Monitor and the Navy under Steam' (Boston 1900); Haswell's and Kent's 'Engineering Handbooks'; Sennet, 'Marine Steam Engineering' (New York 1898); and the various professional papers issued by the United States Navy Department. **WILLIAM MOREY, JR., C. E., Consulting Civil and Mechanical Engineer, New York.**

Screw-worm Fly, one of the flesh-flies (q.v.) most troublesome to domestic animals in the southwestern United States. It lays its eggs in wounds, and the twisted larvæ feed and move in the flesh, making a bad sore.

Scribe, skrēb, **Augustin Eugène**, French dramatist: b. Paris 24 Dec. 1791; d. there 20 Feb. 1861. He was originally intended for the legal profession, but early abandoned it for the more congenial occupation of a writer for the stage, in which after a careful study of the public taste his success was very decided. His first piece was 'Les Dervis,' written in conjunction with his friend Germain Dalavigne, and produced in 1811. Scribe's dramatic pieces comprise all the departments of the lighter kind of drama, and from their gaiety and interest of plot, as well as the felicitous manner in which modern French life is depicted have acquired a universal popularity in Europe, and have also been introduced on the English stage in the form of translations. Among his vaudevilles may be mentioned 'Le Comte Ory,' 'Le Nouveau Pourceaugnac,' and 'Une Visite à Bedlam.' He wrote for the Odéon, the Porte St. Martin, and the Variétés theatres, but more especially for the Gymnase Dramatique, to which he furnished 'La Maitresse du Logis'; 'Malvina ou un Mariage d'Inclination'; 'Le Mariage de Raison'; 'Genéviève, ou la Jalousie Paternelle'; 'Maitre Jean, ou la Comédie à la Cour'; 'L'Amitié, ou les Trois Epoues'; 'Héloïse et Abélard'; and numerous other pieces. To the Théâtre Français he contributed 'Bertrand et Raton' (1833); 'Le Verre d'Eau' (1840); 'Adrienne Lecouvreur' (1849); and 'Les Contes de la Reine de Navarre' (1850). In collaboration with Legouvé he wrote 'Batailles des dames' (1851), and 'Les Doigts de Fée' (1858). As a writer of opera librettos Scribe is also deservedly famous, having supplied composers with the text of the most celebrated of those produced at the Grand Opera and Opera Comique. Of these mention

may be made of 'La Dame Blanche' (1825); 'Fra Diavolo' (1830); 'Robert le Diable' (1831); 'La Juive' (1835); 'Les Huguenots' (1836); 'Les Diamants de la Couronne'; 'Les Martyrs'; and 'Le Prophète' (1849). From the multiplicity of works with which he was engaged, Scribe, like other French authors, availed himself largely of the assistance of collaborators, and much therefore which bears his name was in reality only subjected to his revision and superintendence. In 1836 he was admitted a member of the French Academy.

Scribes, Jewish. Originally nothing more than copyists of the law, a business which they followed as a means of livelihood, the Jewish scribes gradually increased the importance of their position until, after the dissolution of the commonwealth, they became the vital force which determined the later form of Judaism. The importance of their office as doctors of the law and interpreters of the Scriptures is shown in many passages in the Old and New Testament. During this rise in the influence of the Jewish doctors they were known by five distinct appellations: (1) the Sopherim, or 'Scribes,' who guarded the Bible against corruption and who read the law; (2) the Tanaim, or teachers of the law; (3) the Amoraim, or doctors of the law; (4) the Saboraim, or teachers of the law after the conclusion of the Talmud, and the Gaonim, or last doctors of the law in the chain of rabbinic succession, the latter title being applied to the presidents of the colleges, which when assembled together, explained difficult points in the Talmud, discussed and answered all ritual questions, and enacted new laws for the regulation of the dispersed congregations.

Scribe, The, an early Egyptian statue now in the Louvre Museum, Paris. Colored red, and with inlaid eyes of crystal, it is regarded as one of the most characteristic illustrations of the art of the fifth dynasty.

Scriblerus Club, The, a club organized by Swift in 1714. An association of writers, its object was the suppression of exhibitions of literary incompetence by means of satire. Pope, Gay, Bolingbroke, and other authors of that day were prominent as members.

Scribner, skrib'nēr, **Charles**, American publisher: b. New York 21 Feb. 1821; d. Lucerne, Switzerland, 26 Aug. 1871. He was graduated from Princeton in 1840, and in 1846 established with Isaac D. Baker the publishing house of Baker and Scribner, and which after the death of his partner in 1850 became known as that of Charles Scribner & Co. 'Scribner's Magazine,' founded by this firm in 1870, was purchased by other publishers and became the 'Century Magazine' in 1881. A new 'Scribner's Magazine' was established by the firm, known since the death of its founder as Charles Scribner's Sons, in 1887.

Scribner, **Frank Kimball**, American author: b. New York 22 Feb. 1867. He was graduated from Williams College in 1890, studied at Harvard Law School, engaged in literary work and for several years has been on the staff of the New York Sun. He has published: 'The Honor of the Princess' (1897); 'The Love of Princess Alice' (1898); 'A Continental Cavalier' (1900); etc.

Scribner, **Frank Lamson**. See **LAMSON-SCRIBNER, FRANK**.

Scribner, William Marshall, American penman: b. Waterboro, Maine, 1824; d. Chicago, Ill., 15 Jan. 1902. He was widely known as the originator of a system of penmanship in use in the schools of the United States.

Scrip, a term commonly used for a certificate of loans or shares in a joint-stock company, whether as a temporary acknowledgment or the permanent voucher of the holder's interest. Scrip may accordingly be either transferable or not transferable. The valid transfer of interest may be effected only by registration in the books of the company, or the transfer of the scrip itself may be held to represent a valid transfer of interest.

Scripps, James Edmund, American publisher: b. London, England, 19 March 1835; d. 29 May 1906. He established the Detroit 'News' in 1873, the Cleveland 'Press' in 1878, the Saint Louis 'Chronicle' in 1880, the Cincinnati 'Post' in 1881, was one of the founders of the Detroit Museum of Art, and in 1903 was elected State senator. He wrote 'Five Months Abroad' (1882); and 'Memorials of the Scripps Family' (1891).

Scripture, skrip'tūr, **Edward Wheeler**, American psychologist: b. Mason, N. H., 21 May 1864. He was graduated from the College of the City of New York in 1884. After pursuing his psychological investigations at the universities of Berlin, Leipsic and Zürich, he was called to Yale, where he became director of the psychological laboratory. He has attained distinction as the discoverer of a method of measuring hallucinations and processes of imagination, and as the originator of a method of producing insensibility by means of electricity. He is also known as the discoverer of the law of the "mediate association of ideas." His contributions to the literature of experimental psychology include: 'Thinking, Feeling and Doing' (1897); 'The New Psychology' (1898), and 'The Elements of Experimental Phonetics' (1902).

Scrivener, skriv'nēr, Frederick Henry Ambrose, English biblical scholar: b. Bermondsey, London, 29 Sept. 1813; d. Hendon 26 Oct. 1891. He was educated at Trinity College, Cambridge, 1838; and from 1846 to 1856 was headmaster of Falmouth School and incumbent of Penwerris, retaining this living till in 1862 he was presented to the rectory of Gerrans, Cornwall. In 1870 he was appointed a member of the New Testament Revision Company, and in 1872 was granted a pension from the civil list in recognition of his services in connection with biblical criticism. In 1875 he became vicar of Hendon, Middlesex, and prebendary of Exeter. He took high rank in the philological criticism of the New Testament, on which he published some valuable works, beginning with an edition of the Greek text in 1858, executed after collating about a score of unexamined manuscripts. His chief work was his 'Plain Introduction to the Criticism of the New Testament' (1861). He also published 'Cambridge Paragraph Bible' (1873); and 'Beza Codex Cantabrigiensis,' etc.

Scriveners' Cramp or Palsy, Writers' Cramp. See OCCUPATION, HYGIENE OF.

Scrofula, a morbid state of the system characterized by usually indolent, cheesy glandular tumors which suppurate and imperfectly heal,

leaving fistulous passages or ugly scars. It is also known as struma, scrofulosis, tubercular adenitis, and tuberculosis of the lymphatic system. Sometimes internal organs, especially bones and joints, are attacked by a low grade of inflammation followed by a caseous degeneration. Scrofula was common in ancient and mediæval times. It was formerly called king's evil, and for centuries was treated by the touch of the kings of England and France. It is now less common than formerly, owing to better hygienic conditions. It is essentially a disease of early life, but may occur at any age. Formerly it was considered a hereditary form of tuberculosis; but before Koch discovered the bacillus of tuberculosis in 1882 scrofula was looked upon by many as a true tuberculosis, since milary tubercles were found in the glands, as afterward were the typical bacilli. Some believe that while many of the lesions are unquestionably tubercular, others, like impetigo, are not. In the marked tendency to caseation and chronic suppuration is seen the so-called scrofulous or strumous diathesis. Undoubtedly the term scrofulous has been misused when associated with bronchitis, pneumonia, tumors of the brain, etc., and should be applied only to inflammations of a peculiar type, especially affecting the skin, mucous membrane, lymphatic system, bones, and joints.

Scrofula may be inherited or acquired. Children having insufficient or improper food, little sunlight, and breathing bad air are liable to develop it, especially if the parents have suffered from scrofula, tuberculosis, or syphilis. The records of English prisons show that during a period when the dietary, ventilation, and other hygienic conditions were poor, "persons entering these establishments in perfect health and free from hereditary taint of scrofula or tuberculosis developed enlarged glands or other manifestations of scrofula during their stay." Better conditions prevailing, "prisoners of the lower classes are mostly discharged in a better state of health than when they were committed."

The symptoms are various, and do not follow each other with a definite regularity. The principal skin affections are eczema, lichen, tubercles of the face, and cold abscesses. There may be phlyctenular conjunctivitis, corneal ulcers, styes, catarrh of the middle ear, enlarged tonsils, or vaginitis. Diseases of the bones and joints are quite common, spinal caries and caries of various of the long bones, as the phalanges of the fingers, the ribs and sternum, and of the nasal bones. A phalanx or metatarsal bone swells with a flask-shaped appearance. The swelling softens, the skin reddens and gives way, and a thin, unhealthy pus escapes. The most characteristic lesion is an enlargement of the lymphatic glands, especially of the neck (several or a chain of them), their long continued suppuration, their scarring or resultant fistulous passages. Hectic fever is sometimes persistent. The prognosis is favorable unless systemic infection occurs. Scrofula is not a protection against consumption, as was formerly supposed, but is a menace. Emaciation and general disorder of nutrition of the body, due to tubercular degeneration of the mesenteric glands (tabes mesenterica) may result and be attended with puny limbs, a prominent abdomen, diarrhoea, etc. Or tuberculosis of the peritoneum, lungs, and other organs may follow or be associated with scrofula.

The preventive treatment of scrofula requires protection from cold and damp, plenty of sunlight, well-ventilated apartments, good and suitable food, and a life largely spent in the open air. When the disease has appeared these preventive means are to be continued in the remedial treatment and if possible the patient should have a residence at the seaside and should take morning salt-water baths. Cod-liver oil, mineral waters containing iodine, the iodinated preparations of iron, and the phosphates of lime and iron are of value. The glandular swellings, if indolent, may be treated with applications of iodine or other absorbents; if irritable, they require anodyne washes or ointments. The opening of abscesses and their further treatment require careful consideration.

Scroggs, skrōgz, **SIR WILLIAM**, English jurist: b. Deddington, Oxfordshire, about 1623; d. London, England, 25 Oct. 1683. His name is a synonym for judicial injustice and cruelty. He was appointed chief justice in 1678 in which office his brutal methods and infamous partiality in conducting the trial of the victims of the "popish plot" soon made him notorious. He was impeached by the House of Commons in 1680 and in 1681 was removed from his office by the king, who granted him a pension.

Scrophulariaceæ, skrōf-ū-lā-rī-ā'se-ē, an order of herbs, sub-shrubs or shrubs widely distributed throughout the world. Some botanists estimate the number of species at about 2,000, among which are many well known garden flowers, such as foxglove, musk-plant, veronica or speedwell, snapdragon, calceolaria, eyebright, mullein, and salpiglossis. Other species have been used in medicine and still others are considered poisonous. They are characterized by irregular personate or bilabiate flowers, arranged in racemes or spikes or in the axils of leaves; fruits either capsular or fleshy; and alternate, whorled or opposite leaves of various forms, generally scentless but sometimes fetid.

Scrub-birds, a family (*Atrichornithidæ*) of large, brown, harsh-voiced birds of the Australian forests, nearly related to the lyre-birds; also called brush-birds.

Scrub Race, in American political history; in 1824 in the Presidential campaign and election the candidates were not nominated by Congressional caucus, as had been the custom. Crawford, of Georgia, was put forward by a quasi-caucus; New England's candidate was John Q. Adams; Clay was nominated by Kentucky, Louisiana, Missouri, Illinois and Ohio; and Andrew Jackson by Tennessee and other States. Jackson received the largest popular vote, but Adams was chosen by the House.

Scrub-turkey. See MEGAPODES.

Scruggs, skrūgz, **William Lindsay**, American diplomatist; b. near Knoxville, Tenn., 14 Sept. 1834. He was admitted to the bar in 1860, but was engaged in journalistic work until 1871, as editor of the *Columbus* (Ga.) *Daily Sun*, and later of the 'New Era,' at Atlanta, Ga. In 1873 he was appointed minister to Colombia, and served in this capacity until 1877, when he was appointed United States consul at Chin Kiang, and afterward at Canton. In 1882 he was returned as envoy to Colombia. His diplomatic negotiations with Venezuela were begun

in 1889, and continued until the settlement of the Anglo-Venezuelan boundary dispute in 1898, the peaceful arbitration of which question was largely due to his efforts. He is the author of: 'British Aggressions in Venezuela; or the Monroe Doctrine on Trial'; 'The Colombian and Venezuelan Republics,' and other works.

Scruple. See WEIGHTS AND MEASURES.

Scudder, skūd'ēr, **Henry Martin**, American clergyman and foreign missionary: b. Panditeripo, Ceylon, India, 5 Feb. 1822; d. Winchester, Mass., 4 June 1895. He was graduated from the College of the City of New York in 1840, and from Union Theological Seminary in 1843. From 1844 to 1857 he was a missionary to India from the Reformed Dutch Church of America, and again devoted his efforts to this cause in 1860-3. His later years were spent in various cities of the United States, where he held Dutch Reformed, Congregational and Presbyterian pastorates. In 1887 he established an independent Protestant mission in Japan, together with his son and daughter, who were also missionaries. He was the author of a 'Liturgy of the Dutch Reformed Church' (1862); 'The Bazaar, or the Vernacular Teacher's Companion'; etc.

Scudder, Horace Elisha, American author: b. Boston, Mass., 16 Oct. 1838; d. Cambridge, Mass., 11 Jan. 1902. He was graduated from Williams College in 1858, engaged as a teacher in New York for three years, and in 1867-70 he edited the 'Riverside Magazine for Young People.' He then entered business life, but soon withdrew to devote himself entirely to literature. His juvenile publications, which were widely popular, include: 'Seven Little People and their Friends' (1862); 'The Bodley Books (1875-87); 'The Book of Legends Told over Again' (1899); etc. His work was not, however, confined within the limits of juvenile literature. He edited the 'Atlantic Monthly' in 1890-8, and contributed much to it, though usually anonymously; edited: 'American Commonwealths'; 'American Poems' (1879); 'American Prose' (1880); and wrote: 'Life and Letters of David Coit Scudder, a Missionary in India' (1864); 'Noah Webster, a Biography' (1882); 'Men and Letters' (1887); 'James Russell Lowell, a Biography' (1901); etc.

Scudder, John Milton, American eclectic physician: b. Harrison, Ohio, 8 Sept. 1829; d. Daytona, Fla., 17 Feb. 1894. He was educated at Miami University, Oxford, Ohio, and was graduated in medicine at the Eclectic Medical Institute of Cincinnati, Ohio, in 1856. In 1857 he was appointed demonstrator of anatomy and served as professor of obstetrics and diseases of women in his alma mater 1858-60. From 1860 to 1887 he filled the chair of pathology and practice of medicine and from 1887 to his death, the chair of hygiene, principles of medicine, physical and specific diagnosis. In 1869 he published the doctrine of specific medication, originated by him, and since that time the basis of practice of the eclectic school of medicine. For 32 years he was editor of the 'Eclectic Medical Journal,' the oldest periodical devoted to American eclectic medicine. He wrote 'Practical Treatise on Diseases of Women' (1858); 'Eclectic Materia Medica and Therapeutics' (1860); 'The Eclectic Practice of Medicine' (1864); 'The Use of Inhalations' (1865); 'Do-

mestic Medicine' (1866); 'The Principles of Medicine' (1867); 'Diseases of Children' (1867); 'Specific Medication' (1871); 'Reproductive Organs and Venereal Diseases' (1874); 'Specific Diagnosis' (1874). He was the most conspicuous eclectic physician of his time.

Scudder, Vida Dutton, American educator and author: b. Madura, India, 15 Dec. 1861. She was graduated from Smith College, Northampton, Mass., and studied at Oxford, England, and in Paris, France. She became connected with the formation of college settlements, was instructor in English literature at Wellesley College in 1887-92 and since 1892 has been associate professor of that department. She is the author of 'How the Rain Sprites Were Freed' (1883); 'The Life of the Spirit in Modern English Poets' (1895); 'Social Ideas in English Letters' (1898); 'Introduction to the Study of English Literature' (1901); 'A Listener in Babel' (1903); 'An Introduction to the Writings of John Ruskin' (1904).

Scudéri, skü-dä-rë, or Scudery, Madeleine de, French writer: b. Havre 15 Nov. 1607; d. Paris 2 June 1701. She gives an account of her early life under the name of "Sapho," the title assigned to her by her contemporaries, in her romance, 'Le grand Cyrus.' At 12, she says, she was spoken of as a person of mature judgment, and was admired by all the world. On coming to Paris she was admitted to the society of the Hôtel Rambouillet, and began to assist her brother Georges, a writer of plays, romances, and sonnets, in his literary labors. Her personal appearance was unattractive; but she seems to have had a well endowed mind, and she is praised by all her contemporaries for the qualities of her heart. Her first romances were published in her brother's name, and he doubtless assisted in the formation of the plot, or at least suggested the plan of her works. The character of the works themselves is sufficiently explained by the circumstances of their production, but their protracted popularity is not so easy to understand. Her admirers range from Christina of Sweden to Mascaron, Fléchier, and Massillon. Boileau himself did not dare to publish his satire during her lifetime. Her works may be regarded as a reflection of the society in which she moved. They consist chiefly of long romances replete with sentiments of love and gallantry; their predominant characteristic is affection.

The heroes of Mlle. Scudéri are the heroes of antiquity, Cyrus, Horatius Cocles, Mutius Scaevola, and Brutus. These and similar personages meet and discuss with appropriate heroines the anatomy of passion in endless conversations of the most refined subtlety.

The names of her characters were only a transparent mask behind which her readers saw and read themselves. The society of the Hôtel Rambouillet furnished the originals for all the heroes of antiquity. Cyrus, it is well known, was the great Condé. The society of the day furnished her with endless materials and the gallantries of the preceding night formed the subject of the day's description. Thus with conversation, epistle, sonnet, and madrigal she worked out a chronicle of petty intrigue under the greatest names of the world's history. After the reunions at the Hôtel de Rambouillet had

been broken up by the troubles of the Fronde, Mlle. de Scudéri opened her own house to a select society on Saturday evenings. In this society, where everybody assumed a sentimental name, love was discussed, according to Mme. de Sévigné, in language so involved, that the speakers were ever in danger of being lost in their own mazes. The interminable conversations and meaningless gallantries which make her works dull at present were precisely what gave them interest when all her characters were known; and as she was admired and respected by those she portrayed, it is evident they were flattered by her portraits. Her principal works are 'Ibrahim, ou L'Illustre Bassa' (1641); 'Artamène, ou le Grand Cyrus' (1650); 'Clélie, Histoire romaine' (1656). Besides these are numerous other romances, poems, and ten volumes of conversations and moral discussions. She obtained the prize in the first competition of the French Academy in eloquence for a 'Le discours de la gloire' (1671).

Scudo, skoo'dō, an ancient Italian coin, named from its bearing the impress of the heraldic shield of the sovereign by whom it was issued. The scudo was of different value in different states and at different times. The recent value of the Roman scudo was about \$1.

Sculling. See **ROWING**.

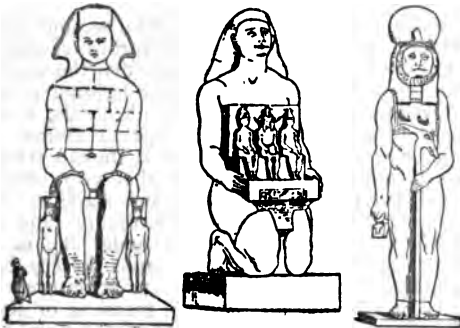
Scul'pins, the name given to various species of spiny-rayed teleostomous fishes of the family *Cottidae*, or to the members generally of that family. The sculpins are fishes of striking appearance owing to the peculiar manner in which the body tapers regularly backward from the large, depressed head, and the large size of the fins. The mouth is large, the eyes placed so that they look more or less upward, a bony rod runs across the cheek between the suborbital and the preopercular bones, and the bones of the head are ornamented in varied fashions with numerous ridges and spines. The skin is largely naked but is often provided along the lateral line and elsewhere with bony plates or spines. All of the fins, and especially the pectorals, are of large size and the latter has a remarkably extended base of attachment. The family is a large one, embracing more than 60 genera and 250 species. Most of the species live in the northern seas among rocks in shallow water, but some remarkable forms live in deep water. Some small species inhabit fresh waters. All are of small or moderate size and are little used for food. Among the numerous North American species the best known is the common or big sculpin (*Myoxocephalus grandidicus*). This species reaches a length of two feet, but is usually smaller and is abundant in the North Atlantic, on the American side as far south as New York. In the Far North it approaches the coast from the deeper water in summer, but on our shores is most plentiful during the winter spawning season. The eggs are laid in large masses attached to seaweeds or rocks. Sculpins are exceedingly active and voracious and devour all kinds of animals dwelling on the bottom. The sea-raven (*Hemirhamphus americanus*) (q.v.) is another noteworthy member of this family. Of the fresh-water sculpins the miller's thumbs (*Cottus*) are represented by numerous species of little fishes which dwell among stones in cold springs, brooks and lakes, laying their eggs in

SCULPTURE

masses on the under side of stones and guarding them until hatched. Consult: Jordan and Evermann, 'Fishes of North and Middle America,' Part II. (Washington 1898); Goode and Bean, 'Oceanic Ichthyology' (Washington 1895).

Sculptors of the United States. See UNITED STATES, SCULPTORS OF.

Sculpture is the art of shaping figures either in the round out of or in relief upon various durable substances. This shaping is accomplished by modeling for wax or clay; by carving for wood, stone, marble, and ivory; and by casting for plaster and bronze. The modeling of a small figure in wax—to make trial of the general effect—and of a full sized one in clay form the first steps in life-sized or other large-scale sculpture of human subject; and these are comparable to the sketch in painting. In very large work, the wet clay is worked onto a rough framework of iron bars and coarse wires by means of the fingers aided with wooden and iron tools; and consequently allows great



Egyptian.

freedom of change in every detail. The small wax figure is fashioned with little or no use of a human model, but the full-sized figure is usually executed either in constant presence of one or with very frequent reference to it; not indeed to copy the living form, but to insure a general truth or keep a hold upon the possibilities of life. Furthermore, in full-sized work, even the draped figure is very generally modeled nude, in the first place, in order to secure harmony of action between the various members whether hidden or exposed. Thus, the legs must lead to the body, as the body to the head if the figure be seated; and legs must anatomically support the body if the figure stand. The modeling must combine with this living reality such abstract beauty as is possible in the case. The plaster cast which is taken from the wet clay model is often retouched by its sculptor. Transference into marble is made by a marble-cutter aided by a pointing machine, and usually supplemented by the artist's own hands. Reproduction in bronze is done by casting in a mold, which has been made upon either model or cast, for all but colossal works like the Liberty in New York Harbor, which are made from hammered plates. The bronze may be left its natural color, or be stained or gilded. The tough and durable bronze, which moreover can be cast hollow, is preferred to the brittle and—in cold climates—disintegrating marble for out-door use. But for interiors the merits are divided; the pale marble makes even delicate transitions

of light-and-shade effective, while its translucence imparts softness to the exquisitely rounded surface; but the dark and opaque bronze obscures these qualities, and therefore calls for emphasis of projections and sharpening of corners to impart clearness to their shadows. Ivory in plates was sometimes used for the fleshy parts of draped statues, and ivory is now used



Venus de Medici.

Achilles.

for statuettes. Wood is used extensively in China and Japan, where its liability to warp and split is obviated by the use of smaller pieces glued together and by lacquering.

Sculpture in relief is used mostly in architectural decoration where its aid is invaluable to relieve the flatness on frieze, panel, or pilaster.



Niobe.

ter. In low or bas-relief, the figures project less than half the rounded form, usually much less; whereas in high-relief they exceed that limit, and then often show heads, arms, etc.,

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wholly detached, and other parts so undercut as to appear detached. Of course, there is a middle-relief between high and low, and sometimes figures are merely outlined by a groove. Relief and background are usually of the same material, but may properly be diverse.

The beauty of sculpture may be analyzed as follows: Though the mass of sculpture matters less than its form, the heroic size befits the grand subject, and pieces destined to elevated



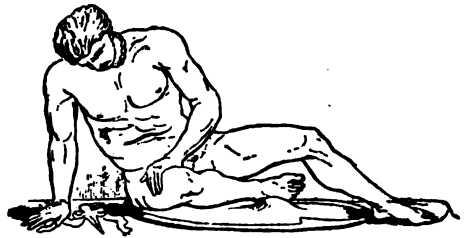
Papirius and Mother.

or remote location must be enlarged to correspond, and at the same time changed in the proportions of their parts and trimmed of details. Since sculpture has the third dimension of thickness, it may be enjoyed by touch as well as by sight, precisely as acquaintances are recognizable by a blind person, and finely modeled statuary has been so appreciated in privileged cases. This solidity also renders possible an endless variety of aspects, according as the observer changes standpoint. The surfaces of the animal or human body—which commonly form the objects of sculpture—are exquisitely rounded in every direction, and the outlines which become visible when we look at these surfaces against a background are mostly curves of consummate beauty, combining lines nearly straight with others of greatest flexion; and the Philistine needs to learn that those on foot or nates are in no wise inferior to those on shoulder or head. These curved surfaces, moreover, can be expressive of underlying substances as varied as bone, sinew, muscle, flesh, and veins; and when they are so, the surface is said to be sensitive, but when they are not, then puffy or monotonous. Contrast is secured by means of massively rounded forms, as of the nude, against the sharp folds of drapery and crisp locks or wavy tresses. Unity among this variety is secured by dominant lines, as in the *Discobolos* of Myron, where an approximate semicircle may be traced from the discus, along the right arm, across the shoulders, down the left arm and left leg, to the left foot; while the bowed trunk and bended right leg show a zigzag quite as plainly.

The effect of the single color in bronze and of the absence of color from marble and plaster is to concentrate attention on the form and line of sculpture, which on that account is enjoyed by certain temperaments more than is painting, and can be utilized by all as special opportunity for a revel in line. But the injury both given and received by a large patch of white among the colored objects of a picture gallery or parlor is undeniable, and should be remedied by investment of the marble statue or relief with some warm tint, as was apparently the practice of the Greeks at all periods. Failing such remedy, the distraction of the gleaming and ghostly marble should be precluded by assigning to it a separate recess or room. But in general the tinting is preferable, since sculpture can then be admitted to the company of flat walls and pictures which its projection will greatly relieve, while they also aid it. Statues and reliefs never appear to such disadvantage as when jostling each other in a store or museum, where numbers satiate, rivalry discounts, and nothing serves as a foil.

The element of light-and-shade becomes important in that mainly through it form is revealed to the eye. This in turn requires that the sculpture should be modified to suit the lighting available, namely, as it comes from either side, from the front, or from above; while of course it should never come from the back, though statuettes placed in windows cause that very effect. A brilliant play of such light-and-shade is the only peer to beauty of line in sculpture; and is often referred to by sculptors under the misnomer "color," is it to make amends thereby for the absence of color from modern sculpture.

As in all other arts, worthy meaning or significance should be wedded to the beauty of sculpture; but here the case has peculiar strength. Since sculpture is solid, it must fully express or exhibit the form of whatever it shows, whereas painting can merely suggest an object, which is indifferent or repulsive in itself, and throw around it the glamour of light or color. Sculpture is therefore limited to such subjects as are capable of exciting interest by their forms taken separately, although it must not be forgotten that form is explained to the



The Dying Gaul.

eye by delicate gradations of shade, the surfaces seeming tinted in this way as they receive light more or less directly. The nobler animals and especially man in the typical activities that become him form the subjects of the separate or independent sculpture most in fashion in the 19th and 20th centuries. Sculpture of such character as this is necessarily the highest in rank. This characteristic of sculpture reaches its maximum in the undraped human

ENGLISH AND ITALIAN STATUARY.



1. Sir Bartle Frere's Statue, Thames Embankment.



2. Statue of Victor Emanuel, Venice.

SCULPTURE

figure, which must therefore belong to the noblest type both physical and mental, that is, in both beauty and significance; but when it so does, proves a very gospel of art in the uplift to finer sense and sentiment which it elicits from the normally minded observer. Sculpture is also the noblest of the decorative arts as well as that the most constantly in use in all ages. Architectural sculpture occupies itself largely with vegetable forms, mingling with them animal and human forms freely treated; and finds its

cels in vigor and movement especially in the representation of animals, but lacks variety and ignores the life of woman. The art of Egypt and Assyria was carried by the Phœnicians both eastward and westward, and proved of special moment in the development of the Greeks.

The wide distribution of the Greeks in Europe, Asia, and Africa, combined with their tribal distinctions to favor a healthy rivalry in the arts. The largest and chief classes of sculpture consisted of, first, free statues, some of which were



Elgin Marbles from the Parthenon, Athens.

highest reach in the nobly designed human form with its drapery, as in the Caryatid porch of the Erechtheum and the portals of Reims cathedral.

Egyptian sculpture, whose first monuments date from the fifth millennium B.C., forms, with that of Chaldea-Assyria, the two tap-roots for subsequent tradition in Europe. Tomb and temple are responsible for the great mass of Egyptian sculptures. Religious belief held that survival of the *ka* or spirit after death depended upon preservation of the body (as a mummy), or failing that, upon provision of a *ushabti* or sculptured portrait. Scenes from the past and future life of the deceased were also sculptured upon the wall of his tomb. Temples were covered within and without with scenes from the victories and consequent offerings to the god made by a king. The workmanship on some of the hardest stones known was superb and achieved only with immense toil, to lessen which the statue was generalized as much as possible, though at the same time made to express the salient traits of the subject. The *ushabti*, on the other hand, called for a realistic portrait, and this was achieved in the softer material with great skill. All of the reliefs and most of the statues received a decorative coloring. Curious conventions gave part of a figure in profile, but part full face; and principal objects, like gods and kings, were represented larger than their fellows.

Chaldean sculpture showed great technical skill as early as the fourth millennium B.C. The tomb had little importance, since the corpse was burned, but temples sheltered idols in stone, and palaces contained demonic images, royal statues, and historical stelæ. Stone was used for the larger pieces, terra-cotta for the smaller. The Assyrians adapted Chaldean art traditions, but gave chief attention to the palace where reliefs depict a king in war or the chase. The style ex-

representations of divinities, others votive offerings, portraits set up at tombs, and the like; and, secondly, temple reliefs, but there also appear civic monuments and others celebrating the life of a sovereign or statesman. Terra-cotta figurines, with mythological and



Hebe — Thorwaldsen.



Venus — Canova.

sometimes grotesque subjects, were fashioned for the home, and stelæ (sculptured slabs) to mark the resting place of the departed. Statuary of rough material or crude execution was colored generally, as where the terra-cotta statuettes have their garments colored throughout, but finer works received intense color to express or emphasize details, as the border or pattern of a cloak, while a tint was spread over the whole.

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Gold, silver, and bronze were both hammered and cast into statues, which were then variously inlaid and provided with realistic eyes. Wood was carved and then painted or else covered with metal plates; and wooden figures made to be covered with drapery were fitted with heads and hands of finer material. Terra-cotta, which ranked with wood as the earliest material used for sculpture and largely in architectural accessories, was also painted in part or whole. In all Greek sculpture, therefore, the finished work was polychromatic.



Michael and Satan — Flaxman.

Crude statuettes remain from a Greek prehistoric stone age, 2500-1500 B.C., and stone reliefs from the Mycenaean bronze age, 1500-1000 B.C. Incursions of Hellenic tribes from Thessaly led to transition and progress, until by the 6th century sculpture in marble and bronze had become a national art, of which there were two types. The Ionic preferred rounded forms, slender proportions, light draperies revealing the figure, and organic groups. It quickly developed the draped female figure. The Doric type shows sturdy, muscular forms, heavy draperies, and figures merely juxtaposed. It developed the nude male figure. But Athens drew sculptors from both sources, and thus combined grace and force to form a third school, the Attic. The 5th century witnessed achievement of a mastery that allows interest in prior work elsewhere only in so far as it contributed to this, and that has remained until this present time, a source of perennial delight and instruction. We are told that Polykleitos brought his athlete carrying a spear, the Doryphoros, to such per-

fection as to furnish a canon or standard for all such subjects. Myron showed fine naturalism in his Discobolos, and the artists who worked under the direction of Phidias combined figures of unsurpassed dignity and beauty into coherent compositions, such as those on the pediments, metopes, and friezes of the Parthenon. The 4th century saw a movement toward slender proportions and graceful line, especially with Praxiteles, as in his Hermes and the Aphrodite of Knidos. The Apoxyomenos of Lysippos, probably well represented by the marble statue in the Vatican, which is assumed to be a copy of the lost original, shows the same qualities, in contrast to the Polykleitan canon. Scopas is said to have excelled in expression of spirited action whether as boar hunt or bacchante. The Aphrodite of Melos, in the Louvre, free equally from shame and coquetry, and uniting superb form with facial expression, belongs to this or a century later. The 3d and 2d centuries saw the diffusion of Greek art over the known world, and the various modifications consequent upon it. The friezes on the altar of Zeus at Pergamon exhibited originality of design and vigorous action; and akin to them are such statues as the Apollo Belvedere, the Diana of Versailles, and the torso of the Belvedere. The group known as the Laokoön belongs to the same general type and period, the ripe autumn of Greek art, but not in any sense a degeneration.

The Romans as a race were deficient in plastic sense. Sculpture appealed chiefly to their personal ambition as portraiture, which under the early empire reached a realistic perfection never before attained. Relief was the next most practised branch of sculpture, and reached great excellence as decorative art and as commemorative representation, in such monuments as arches and columns, especially those of Trajan. Roman taste for imaginative sculpture depended almost entirely upon Greek sculptors resident in Rome and upon Greek masterpieces, which were transported thither in great numbers from the entire Greek world. Finally, sculpture declined along with the Roman Empire, until in the 4th century A.D. not even fair copies could be made.

Early Christian art, which extends from the 3d to the 6th centuries, found use for sculpture only on sarcophagi, where scenes from the Old Testament were depicted in high relief by artisans rather than artists. What the barbarian incursions did to break the continuity of artistic tradition in the West was accomplished in the East by the Iconoclast persecutions, so that Byzantine sculpture from the 7th to the 9th century calls for no further notice.

Medieval sculpture, from the 8th to the 14th centuries, had various fortunes in Italy and the North. In Italy it was applied as relief to the decoration of church furniture such as pulpits, altars, and fonts; whereas in France and Germany both reliefs and statuary formed an integral part of the Gothic architecture on portal and façade. Sculpture, founded upon classical models, was revived in Italy near the middle of the 13th century, under the leadership of Niccola Pisano. His son, Giovanni, felt the influence of northern schools, and introduced thence the allegorical and symbolic qualities of Gothic. His successor, Andrea Pisano, led the

CLASSIC SCULPTURE.



1. Perseus.

2 Apollo Belvidere.

3. Discus Thrower.

4. David.

Gothic school in Italy to the highest excellence it attained. His breadth, vision, and technique transformed sculpture precisely as these qualities in Giotto did the contemporary painting. The worthy successor of Andrea Pisano was Andrea Orcagna, a genius who gave less attention to sculpture than he did to its related arts.

The splendid development of stone sculpture in France, from the 11th to the 14th centuries, occurred in its application to the exteriors of Romanesque and notably of Gothic cathedrals. Front and side portals and façade niches were crowded with life-sized or colossal statues, while archivolts and tympana were filled with high reliefs. This subordination of sculpture to architecture involved loss of freedom and sacrifice of details, but the earlier severe stiffness had been overcome by the 13th century, when new buildings were in progress all over northern France. The thousands of figures on such cathedrals as Chartres, Reims, Amiens, and Notre Dame, were planned to visualize the encyclopædic system of mediæval theology. Almost no artists' names are known, and the scanty data indicate that while the ablest masters went to nature and to human models, both nude and draped, the mass of sculptors followed canons of form and pose prescribed for them by these masters, who must also have superintended the whole composition. These French sculptors of the Gothic period acquired the same technical mastery over stone as did the Greeks of the best period; and, like them again, were fond of polychromy, though this has only lately been recognized by historians of art. French sculpture of the late 13th and the 14th century loses in dignity, but gains in charm, humor, and dramatic effect.

Mediæval sculpture of stone achieved no such results in Germany as it did in France, but excelled all other European countries in metal sculpture for church furniture, as it did also in goldsmith's work, where it followed early Christian and Byzantine models. In the 12th century German sculptors applied stone statuary to the enrichment of cathedral interiors, especially about the choirs; and in the 13th century, under French influence, extended this enrichment to the exterior, but the figures were both fewer and soberer, copying French lightness and grace only in the Rhenish school. About the middle of the 15th century, naturalism in wood carving for altar-pieces, etc., displaced the formalism of this architectural sculpture.

The Renaissance in sculpture, as in the other arts, took place in Italy, whence it was carried to other countries. Powerful families now displaced the community in patronage of art, just as the single artist did the school in its production. Associated with this individualism was the naturalism that showed itself both in the choice of contemporary subjects and in change from a conventional to a naturalistic treatment of forms. Both were powerfully promoted by the revival of classic subjects and forms, which is signified by the term Renaissance. In point of form, however, the modern sculpture was more nearly pictorial than the classical as a whole. The 15th century was one of transition, the 16th felt the full sway of the new spirit. In both these centuries the subjects most

in demand remained religious for the lavish decoration of churches both exterior and interior, in both relief and the round. But squares and gardens, palaces and houses, also shared in the exuberance of restored art. The religious subjects were of necessity drawn from the Scriptures and the legends of the saints, with the Madonna and Child by far the most popular. But civic and domestic sculpture frequently employed classic themes, and wealthy persons resumed the Roman practice of collecting antiques. Bronze came again into general use, and the demand for refined form favored marble



Victory — Rauch.



Caractus — Foley.

among the stones. The intensity of white marble was toned down by use of wax, and details such as hair and ornaments were usually gilded. Terra-cotta and the still cheaper stucco displaced marble in works destined for country towns; and reproductions of masterpieces often reached the common people by this means.

Only the chief sculptors can here be selected for brief notice. The leadership among eight distinct schools of sculpture during the 15th century was held by Florence. Its masters during the first half of that century were Ghiberti, Donatello, and Luca Della Robbia. Ghiberti's masterpiece was the bronze doors for the baptistery at Florence in which sculptural perspective and harmonious composition called forth Michelangelo's encomium. Robbia showed masterly composition in his choir-gallery reliefs, and founded a school of glazed terra-cotta sculpture. Florentine masters during the late 15th century were Desiderio da Settignano, Benedetto da Majano, and Mino da Fiesole in marble, and Verrocchio and Pollajuolo in bronze. Desiderio was distinguished for a harmony and refinement much emulated by his contemporaries. Verrocchio's masterpiece was the equestrian statue of Colleoni in Venice, reputed to be the finest extant. The Milanese school indulged a taste for luxuriant decoration in terra-cotta, and the

Venetian for rich, graceful forms that appealed to emotion.

The high Renaissance, nearly contemporaneous with the 16th century, brought to sculpture an influence over its sister arts of architecture and painting that it had never enjoyed before. This sculptural treatment went to excess when statuary overbalanced the architectural construction of a wall tomb or even of an entire façade. In sculpture itself dignity of design yielded its late prominence to modeling of surface, posing of arms and legs, and the movement of drapery, all aimed at greater effectiveness. Other artists of the period were overshadowed by Michelangelo Buonarroti, a master equally of architecture, sculpture, and painting, but sculptural in all; for his dominant interest was with the nude human form. His chief sculptures in his best manner are the Moses, the Two Slaves, and the Medicean tombs at Florence. Each is but member of an incomplete whole. The freedom of modeling developed in marble by Michelangelo was paralleled in bronze and goldsmithy by Benvenuto Cellini and Giovanni da Bologna. Cellini's masterpieces consist mostly of smaller decorated objects, but larger works are the Nymphs at Fontainebleau and the Perseus at Florence. Bologna treated classic themes with great freedom and grace.



English Gothic Sculpture.
From Peterborough
Cathedral.



From York
Cathedral.

During the decadence of the 18th and 19th centuries, sculpture ran riot in Italy, both as to quantity and quality. Dignity and repose were displaced by dramatic emotion and movement. Lorenzo Bernini swayed 17th century sculpture by pandering to this theatrical taste.

The Renaissance in other countries than Italy was no rebirth, but simply an importation of the new Italian style and modification thereof by the national spirit. In France, where the splendid Gothic impulse had not yet expended itself, magnificent work was done by such sculptors as Michel Colombe, Ligier Richier, and the unknown artists of the churches at Abbeville and Saint Riquier; but the Italian style found a welcome in the actual person of

numerous Italian sculptors. The 16th century witnessed the transformation or erection of great châteaux, public buildings, and churches, all of which called for sculptured decoration after the early Renaissance style. The great sculptors in this work were P. Bontemps, J. Goujon, and G. Pilon, among whom Goujon especially displayed the new harmony and elegance. In the 17th century the tendency was to superficial pomp of the Versailles type, which characterizes the work of F. Girardon and P. Puget and of their successor, N. Coysevox, at the beginning of the next century. This grand art of Louis XIV. was succeeded by one of grace and delicacy in the course of the 18th century, when J. B. Lemoyne, E. Bouchardon, J. B. Pigalle, and J. A. Houdon did their work, the last named especially in portraiture.

The Renaissance movement in other countries offers little interest. In Germany it reinforced the naturalistic movement already begun there, but was accepted slowly especially in the northern part where Gothic influence from the Netherlands continued. In the 16th century forms peculiar to Flemish Renaissance mixed with those of the Italian throughout Germany, and in the 17th and 18th centuries the Rococo style of the Romanists shared the field with the bareness of the Protestants.

The Netherlands combined Italian with its native style in the 16th century; Austria followed in the wake of Germany; while Spain and England depended upon imported Italian artists, until the 17th century, when native sculptors appeared. In England N. Stone supplied sculpture for many buildings designed by Inigo Jones, as did G. Gibbons for others



Night — Schilling.

by Sir C. Wren. All important English works of the 18th century were executed by Flemish or French sculptors, but toward its close John Flaxman started a home revival by his exquisite reliefs for Wedgwood pottery.

Nineteenth century sculpture very naturally reacted from these dramatic excesses to a classicism which erred in the opposite direction by coldness and formality. Sculptors from all nations visited Rome to study its antiques. This reform was in turn superseded by the roman-

SCULPTURE IN THE UNITED STATES

ticism natural to the new national and democratic aspirations, to which was later added that naturalism accordant with scientific methods in other spheres of life. Both these new movements involve individualism in contrast with the generalized types of classic art, and their centre was and is not Rome, but Paris.

The classical revival in Italy was led by A. Canova, who excelled in the grace of his female types. Among the romanticists P. Fedi was distinguished, and among the realists G. Dupré and V. Vela. Most of the current Italian sculpture consists of attractive work in trivial subjects which command a ready sale to tourists. Denmark supplied the next leader of classicism in B. Thorwaldsen; while other great classicists outside of France were Germans, such as J. H. Dannecker and J. G. Schadow. Works like the statues of Queen Louise and Frederick the Great conferred distinction upon C. D. Rauch; and the colossal Germania, though florid and detailed, did the same for J. Schilling. More recent German sculptors are divided between the romantic and naturalistic schools. Russian sculpture, which could be only of recent growth in any case, suffers from interdict by the Church against sculpture in the round, and by the state against sculpture in bronze except for the ruler and high officials.

The commanding position in sculpture during the late 19th century has been held by the French, and the best sculptors of other countries, particularly England and America, have been trained in Paris. The early classicists and romanticists have now only historic interest; but three naturalists were potent masters: David d'Angers won fame by his medallions; F. Rude produced in his 'Departure of the Volunteers' upon the Arc de l'Etoile at Paris one of the greatest works of all French sculpture; and A. L. Barye made precedents in his massive modeling, especially of animals. During the second half of the century naturalism has retained full sway, having absorbed into itself the best of other schools. The leader from classic restraint to the freedom of naturalism in this re-renaissance of art was Paul Dubois, born 1829, but still active as director of the Ecole des Beaux-Arts in Paris and acknowledged master of the school. More of the classic spirit was shown by H. Chapu, whereas J. N. Falguière has often proved frankly carnal. But perfect balance is held by L. E. Barrias in his 'First Funeral,' which ranks as the most representative masterpiece of modern sculpture. A. Mercié's 'Gloria Victis' is another modern masterpiece. Marceaux and Delaplanche are also distinguished. Sculptors of more pronounced naturalism are J. B. Carpeaux, famous for his joyousness and his light-and-shade; E. Frémiet, now chief of animalists; A. Caïn, J. Dalou, and especially A. Rodin, famous for his characterization and his neglect of details.

The English have never excelled in sculpture. Stevens, Foley, Boehm, Woolner, and Armstead did creditable work, but have been surpassed in all respects by the recent naturalists with their technical ideal, not of pure form, but of expressive modeling, learned in Paris. Such are G. F. Watts and F. Leighton, the famous painters; H. Thornycroft, E. O. Ford, and A. Gilbert. For American sculptors, see

Bibliography.—Lübke, 'History of Sculpture' (1878); Radcliffe, 'Schools and Masters of Sculpture' (1894); Marquand and Frothingham, 'History of Sculpture' (1900); Murray, 'History of Greek Sculpture' (1890); Brownell, 'French Art' (1892); Sturgis, 'The Appreciation of Sculpture' (1904); and for the principles of art involved, Brown, 'The Fine Arts' (1896).

EDMUND BUCKLEY, PH.D.,

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Sculpture in the United States. Several foreign artists brought their art to America in the colonial days, though it cannot be said to have exercised much influence. Of these, J. A. Houdon, the Frenchman, was the only one of renown. Guiseppe Cerrachi, an Italian of French training, was in America for a time. John Dixey settled here and died in 1825. His work is mostly destroyed, and he is known to us chiefly from Dunlap's book (see *Bibliography*). Houdon's 'Washington' is the only piece by any foreigner of this early day which commands attention. It stands in the State Capitol of Richmond.

Contemporary with these were several self-taught Americans who, as was natural, worked rather in less costly and durable materials than marble or bronze. John Frazee, who was almost a wholly self-taught student of the human form, left behind him several marble busts of distinguished men which are thought to have merit. The name of Patience Lovell, who became Mrs. Wright and worked rather in London than in America, passes for that of our first native-born sculptor. William Rush, who died in 1833, worked in Philadelphia, carving wooden figure-heads for ships, and there are interesting stories about his strong desire for good living models and his efforts to get very close to life. A bust of Washington is in the Pennsylvania Academy of the Fine Arts, and a wooden statue has been closely copied in bronze and stands in Fairmount Park, Philadelphia.

Sculpture in the usual sense begins in America with Horatio Greenough (1805-52) and Thomas Crawford (1813-57). Each of these studied in Rome, and each came under the influence of Thorwaldsen, who, during the early years of the 19th century, had obtained an influence as great as that held just previously by Canova. The statue of Washington at the east of the Capitol at Washington is spoken of as "an Olympian Zeus" in its treatment, but it is really a work like those ideal portraits of Roman emperors which crowd the long galleries of the Vatican. It is a deified mortal shown as nude from the waist, holding a sheathed sword and pointing heavenward, and is a work of much dignity and artistic feeling. At the Capitol, too, is the most important work by Crawford, the bronze doors of the building, but, as he lived till 1857, the growing prosperity of the country gave him an opportunity to introduce modern ways of thought, and the statue of Beethoven in the Boston Music Hall resembles the art of the second half of the century in its conception. His marble 'Orpheus' in the Museum of Fine Arts of the same city is a not unworthy piece of classical revival. Immediately following these men was Hiram Powers, who lived until 1873. He gained much dexterity of modeling and a fairly complete

knowledge of the human form, but his work had little thought to inspire it. The portrait busts are more important, certainly, than the famous 'Greek Slave,' of which many replicas were made and which was as much admired in Europe as in the United States.

Henry Kirke Brown (1814-86) seems to give the first powerful impulse to American sculpture, for it is he who modeled the equestrian statue of Washington in Union Square, New York, and that of Gen. Scott in Scott Circle, Washington city. Those are pieces worthy to rank with good European monumental sculpture of recent times; and indeed, only the exceptional pieces of imaginative power can be thought to excel them. The pedestals, also, are tasteful and suit the statues well. There is a standing statue of Nathaniel Greene, the famous Revolutionary general, in the Capitol at Washington, and this is a really meritorious portrait statue; the costume well treated, the figure well posed, and the introduction of the military cloak thrown over the left arm and used to give mass and weight to the lower part of the figure quite exemplary. While the world was excited over Hiram Powers and Clark Mills, this worthy and highly trained sculptor was gradually making his way and leading up to the success of later times. There was perfunctory sculpture in abundance at the same time. The statues of Erastus Dow Palmer (b. 1817), William Henry Rinehart (1825-74), and Randolph Rogers (1825-92) are popular as having a gentle sentimentality about them. William Wetmore Story (1819-96), a man of ability and an excellent writer, had everything to make him a sculptor, except, apparently, the power of seeing and treating form in the statelily way which to him seemed the only way. Thomas Ball (b. 1819), is a portrait sculptor who has always been esteemed.

The list of sculptors who were famous before the Civil War includes several women. Harriet Hosmer (b. 1830), Vinnie Ream Hoxie (b. 1847), and Anne Whitney (b. 1821) are most prominent among these, and the last named has produced portrait statues and ideal portrait statues of considerable merit. The most popular of the living sculptors of that time was John Rogers (b. 1829), whose little groups of portrait and semi-military subjects had an enormous sale during the years 1860 to 1870. These were rightly considered a translation into solid form of spirited and popular book illustration.

J. Q. A. Ward is the one man who connects the earlier sculpture with that of our own times. He was born in 1830, and his long and successful career is not yet closed. Monumental statues, groups, portrait statues and portrait busts, and recently the great pediment of the New York Stock Exchange, make up his remarkable record. A younger man and one whose death in 1896 at the age of 52 years was a loss to sculpture, was Olin L. Warner. His portrait busts are not more admirable than his decorative relief. Again a little younger is Augustus Saint-Gaudens (b. 1848), who has risen to the greatest reputation possible, and is singularly gifted at combining sculptural charm with vigorous treatment of popular themes.

Daniel Chester French (b. 1850) stands in the first rank of American artists, having a

singular grace and delicacy combined with a ready grasp of sentiment of the most exalted kind. Charles H. Niehaus (b. 1855) is our neo-classic sculptor, a devoted student of the nude body treated in the spirit of Græco-Roman art. Paul Wayland Bartlett (b. 1865) is a very powerful sculptor of beautiful detail, expressing, too, in his most successful work, a singular insight into human character. Karl Bitter (b. 1867) has done much architectural sculpture, beginning with that which was unduly violent and treated as if rapid motion were his chief end, but this has disappeared in later work. J. Massey Rhind (b. 1860) and Philip Martiny (b. 1858) have done excellent work in architectural sculpture. Herbert Adams (b. 1858) has singular delicacy of conception, which his admirers trace to a careful study of the Italian Renaissance. This gift, excellent in portrait busts, is triumphant in architectural work. Andrew O'Connor, Jr. (b. 1874), has recently produced sculpture of astonishing fire and decorative effect. We have still to name Frederick W. MacMonnies (b. 1865), a pupil of Saint-Gaudens and of strong French proclivities; F. Edwin Elwell (b. 1858), author of the equestrian statue of Gen. Hancock at Gettysburg; Geo. E. Bissell (b. 1830), whose "navy" group of 1899 excited most sincere admiration; Thomas Shields Clarke (b. 1860), who has exhibited little work, but that little of singular intensity of conception and generally of fine design; George Grey Barnard (b. 1863), who is striving to produce in solid form the loftiest ideal conceptions of the soul; F. Wellington Ruckstuhl (b. 1853), and William Ordway Partridge (b. 1861), who have done meritorious monumental work; Frederick Remington (b. 1861), a painter and illustrator, has also done excellent work, and in the same line of far Western type; Gutzen Borglum (b. 1867) and Solon Borglum (b. 1868).

The disposition to add important sculpture to large buildings, which was very evident about 1855 to 1895, seems to have declined in America since the beginning of the new century. There are, however, important instances to the contrary, and it is probable that the change is wholly of the moment. The question of the treatment of sculpture in connection with architecture remains not satisfactorily answered, for while the admirable re-study of Romanesque art in the porch of Trinity Church in Boston is the best thing we have in the way of architectural decoration, it is felt to be less artistically important than the sculptures of some of the men named above, as in the porch of St. Bartholomew's Church in New York.

Bibliography.—William Dunlap, 'History of the Rise and Progress of the Art of Design in the United States' (1834); Marquand and Frothingham, as above, chap. xxvii.; Charles H. Caffin, 'American Masters of Sculpture' (1903); Lorado Taft, 'The History of American Sculpture' (1903); Russell Sturgis, 'Appreciation of Sculpture,' chaps. vii.-ix. (1904).

RUSSELL STURGIS,

Author of 'The Appreciation of Sculpture.'

Sculpture, Education in. We know little of the education of the sculptor in ancient Greece, and can only guess at the training which produced the greatest sculptors the world

has seen. In the Middle Ages and the Renaissance education in sculpture proceeded on much the same lines as education in painting, the young sculptor entering the workshop of a master and learning thoroughly all the mechanical parts of the trade before he attempted anything in the way of independent study of nature. To-day the education of the sculptor is organized in the same way as that of the painter and the student has much the same training in the observation of nature and much the same lack of training in the essentials of art. There are, however, certain differences between the conditions under which sculpture and painting are carried on in modern times which seem to favor the education of competent craftsmen in sculpture. The mere bulk and weight of material involved in the creation of heroic statues or groups makes it inevitable that the sculptor should have some assistance, and most prominent sculptors are more like the heads of mediæval shops than are almost any modern painters. Apart from the more or less illegitimate employment of what are known as "ghosts" (that is, artists, often, of more ability than the employer, who actually produce the work for which the employer secures the commission and appropriates the rewards), a sculptor may have a corps of perfectly legitimate helpers who vary from the mere studio boy or the caster to the accomplished modeler. Many young sculptors thus pass through the studios of their seniors and gain invaluable experience in the actual production of works of art which is supplemented, either before or afterward, by a regular school education. Such a double training is the best our time has to offer, and is certainly far better than either an apprenticeship or a term of study in an art school taken singly, but it is not yet an ideal training.

The technique of sculpture, as far at least as regards the handling of the clay or wax model, is an infinitely simpler thing than that of painting. There are no complicated processes to master, no questions of the chemistry of pigments, of the optical effects of colors on each other or of the different qualities of reflected and transmitted light, such as are involved in the manipulation of paint. Modeling is a matter of knowledge of form and facility of hand, and both the knowledge and the facility might be attained as readily in the school as in the studio, for there is so much rough manual labor to be done in a sculptor's studio that a helper might work there for years without doing much real modeling. And the technique of modeling is, after all, of relatively little importance; for the sculptor, unlike the painter, puts his personal handiwork upon a thing destined to be destroyed and never to be seen by the public. He works in clay or wax while it is the interpretation of his work in marble or bronze that is set before the world, so that he is almost in the position of the draughtsman upon the wood block, whose work ceases to exist and is replaced by that of another. The sculptor of the Renaissance was either a stone carver or a bronze founder or both, and the craft he practised was the craft of carving or of metal working, the modeling being only a preliminary and being sometimes dispensed with altogether. The modern sculptor tends to become a modeler and to put all his strength into the

clay, the final carrying out of his ideas being largely intrusted to others, and his knowledge and invention count for much more than his skill of hand, while the worker in stone or bronze rarely becomes an original artist. Of course the best of our sculptors do not only control and oversee the final carrying out of their work, but actually put hand to it themselves, at times, and even when they do not they must vary the manner of modeling they employ according to the material of the definitive work, and these variations of manner they will teach their assistants. Also there is a great deal to be learned in a sculptor's work shop hardly likely to be picked up elsewhere, were it only the mechanics of setting up great armatures, the processes of pointing and enlarging small models, and the rest. Still there is some tendency to a divorce between the original artist and the workman, and it is difficult for the modern sculptor to become a thorough master of his craft, thinking naturally in stone or bronze rather than in clay.

There is another respect in which the education afforded by the apprenticeship of the Renaissance was greatly superior to that obtainable in a modern studio. The Renaissance master was often a painter as well as a sculptor and, not infrequently an architect as well, and the essential unity of the three great arts of design was inevitably impressed upon his pupils. The modern sculptor rarely knows anything of painting or architecture, and his studio assistant has little opportunity even to learn drawing, the foundation of all the arts. If he would learn to draw he must study in an art school, and he is generally encouraged to do so in such time as his necessary work leaves at his own disposal. In the modern art school the students are allowed, or even required, to change from class to class, and their chance of acquiring some notion of the interdependence of the arts, and some breadth of artistic culture, is greater than that of the mere studio assistant. Such interchange of work between drawing or painting and modeling would be of great benefit to the painter also, if he more often took advantage of it, but is hardly as essential to him as to the sculptor.

In some measure, then, the schools offer a valuable supplement to the training of the studio, but they do not give nearly all that they might or should give. Of the true meaning of composition, and of the difference between artistic expression and imitation, the school, at its best, can give no such idea as can the studio, where the actual production of a work of art, through all its stages, may be watched. Yet the students might be encouraged and aided in the actual carrying out of original work, taught something of the difference between the use of the model for the attainment of a predetermined result and the mere copying of a set pose, and, possibly, instructed in casting, pointing, marble cutting and even bronze founding and chasing and the production of various patinæ. A thorough mastery of drawing cannot be too much insisted upon. Of course the constant study of modeling from the living figure would continue to be the principal element of training, but it would be well if some study of drapery and costume could be added to it. The graduate of our art schools, either painter or sculptor, generally knows lit-

tle or nothing of the arrangement of draperies and this is one of his most serious deficiencies.

Such a course of instruction as is here sketched has been attempted, but has never been thoroughly worked out in our schools. It could hardly fail to prepare the student for more efficient service in the studio of a master than he is now generally able to give, and to enable him to acquire more surely and rapidly that practical knowledge of real work which no school, however managed, can supply. See ARCHITECTURE, EDUCATION IN; PAINTING, EDUCATION IN.

KENYON COX.

Sculpture Society, National. This society was founded 30 May 1893 and incorporated 1896. Up to the earlier of these dates sculpture had received somewhat grudgingly a place in the picture exhibitions and this fact led the sculptors to band together for a separate organization. In 1895 an exhibition for sculpture alone was held in New York, the objects shown having the advantage of a background of architecture, trees, shrubbery, and flowers. One reason for the existence of the National Sculpture Society was to provide a centre of authority regarding public and private monuments, and among the public works where its influence has been exerted are the decorations for the Library of Congress, for the decorative sculptures on the building of the Appellate Court of New York, the Dewey Arch and Colonnade erected at Broadway near Madison Square, New York, to celebrate the home coming of Admiral Dewey, and the decorative sculptures on the New York Public Library now in process of erection.

Scup, one of the names of an important American food-fish (*Stenotomus chrysops*) belonging to the family *Sparidae*, to which the sheepshead and snapper also belong. Besides some technical characters of the skeleton and swim-bladder the scup may be known among fishes inhabiting the same region by its deep compressed body, prominent dorsal spines, of which the third is elongated and the caninelike incisor teeth. The color is silvery gray with purplish reflections above, pure silvery on the sides below. This fish is abundant from Cape Cod to the Carolinas and reaches a large size on rocky ledges where food is abundant, though ordinarily not exceeding 9 or 10 inches in length; it reaches a remarkable size at the age of two years. Consult: Goode, 'American Fishes,' New York 1888; Jordan and Evermann, 'American Food and Game Fishes,' New York 1902.

Scurvy, a disease resembling purpura, characterized by inanition, anæmia, asthenia, ecchymoses, and a tendency to swelling and bleeding of the gums. It is mainly due to disordered nutrition from improper food. Sometimes it follows a deficiency of fresh vegetables and fruits, or an excess of salt fish and pork, the use of tainted food, a too monotonous diet, or an insufficient amount of food. General ill health and malnutrition, and a cold, damp winter, compelling persons to house themselves, are predisposing causes. No condition of the blood differing from that found in other anemias has been recognized. Some believe that the disease is an infection because it has often spread rapidly in prisons, workhouses, etc., and sometimes has a distinct period of incubation, and because one attack, as a rule, confers immunity. It is not related to relapsing fever, which is contagious.

Up to the middle of the last century scurvy was frequent during wars, pestilences, and famine, and especially on long sea-voyages when the diet consisted largely of bread, tea, and salt meat. During the Crimean war 23,000 cases of scurvy occurred among the French troops alone, and in the American Civil War 15 per cent of the deaths were from this disease, though many cases recovered, owing to the use of vegetable food furnished by the Sanitary Commission. At the present time scurvy is comparatively rare, as most vessels going on long voyages are supplied with a variety of anti-scorbutics, canned meats, lime-juice, lemons, and other fruits, vegetables, etc., and on land, in civilized countries, or at least where hygiene is not rudimentary, fresh fruits and vegetables are more used than formerly.

In scurvy the blood coagulates poorly, its red corpuscles are diminished, while the white are increased in number. Sometimes there is oedema of the feet and ankles and serous exudation into the pleural and large joint cavities. There are purpuric spots in the skin, especially on the legs, ecchymoses in the pleura, pericardium, cerebro-spinal meninges, synovial membranes and in the mucous lining of the bronchi and alimentary canal; and hæmatoma in muscles like the gastrocnemius and glutæus, which may suppurate or in part organize. The gums are swollen, especially about the teeth, and their deeper layers are thickened; fatty changes occur in the liver, spleen, kidneys, and heart; the bones may be carious or fractured; and the bone-marrow and mesenteric glands may display hemorrhagic infiltration. In infants the ecchymoses are almost entirely subperiosteal, the blood raising the periosteum (usually of femur, sometimes of tibia or fibula, rarely of the bones of forearms or other parts) in a fusiform swelling, surrounding the bone. The bones become thickened and sometimes superficially necrosed. The epiphyses may separate. The gums may be spongy.

The symptoms of scurvy, which usually develop slowly, include lassitude, anæmia, flaccidity of muscles, a cool, dry skin, with sometimes a yellowish pallor. When the disease is developed the gums are red, nodular, or fungous, and bleed readily. When the disease is advanced, hemorrhage occurs internally or externally, the breath is offensive, the gums ulcerate, and the teeth loosen. There is thirst, with a craving for sour food and condiments; the joints are swollen and painful; syncope, dyspnoea, and pulmonary congestion are common; the urine is scanty, high-colored, and less than normally acid; the temperature is subnormal (96° F. or 97° F.). The patient is pale, feeble, much emaciated, mentally depressed, and may have low delirium and coma. Meningeal hemorrhage may cause convulsions or hemiplegia. In infants, over the inflamed periosteum there is intense pain and tenderness, swelling, and a tense, shiny skin. The child screams when moved, loses appetite, emaciates, grows pale and feeble, perspires freely. There is usually diarrhoea, sometimes hæmaturia, hemorrhagic blebs in the pharynx, and extravasation of blood in the orbit. Other extravasations, however, are rare.

Scutari, Turkey, (1) capital of the sanjak of Scutari in Albania, at the confluence of the

SCYLLA—SEA-ANEMONE

Bojani and Drinassi, lies near the lake of the same name. The town is fortified, the citadel crowning an eminence. There are besides, two castles, mosques, Greek and Catholic churches, ship-building yards, and factories for cotton and fire-arms. There is an active trade. The exports include wool, wax, hides, skins, tobacco, and dried fish, sent to Trieste, Venice and Avlona. The imports are colonial produce, silk and other manufactured goods which are sold at the large fairs. The fisheries are important. Pop. 35,000.

(2) The province or Sanjak of Scutari contains 4,516 square miles, and has a population of 322,000.

(3) The Lake of Scutari is 18 miles long, by 6 miles wide; on the northwest it receives the Moracca. The Bojana forms its outlet into the Gulf of Drino in the Adriatic Sea.

Scylla, sīl'a, a character in mythology, the daughter of Nisus, king of Megara, who, when Minos came from Crete to attack Megara, in revenge for the death of his son, Androgeos, was led by her love for Minos to cut off from the head of her father, King Nisus, a purple lock of hair, which while it remained on the head of Nisus, made it impossible for Minos to take the city. Megara was captured and Nisus slain, and Scylla was either drowned, or changed into a fish which Nisus, changed into an eagle, constantly pursued.

Also another Scylla, mentioned in the Odyssey, as a monster with twelve feet, six necks and six mouths, and occupying a rock on the Italian coast. Legends represent her as having been a beautiful woman changed into a monster through the jealousy of Circe or Amphitrite.

Scylla and Charybdis, ka-rīb'dīs, the former a promontory of southern Italy, at the entrance of the strait which divides Italy from Sicily. Navigation around this promontory was considered dangerous by the ancients, but is regarded by moderns as not attended by special difficulty. Charybdis is a whirlpool nearly opposite the entrance to the harbor of Messina in Sicily, the navigation of which is regarded as very dangerous even to vessels of the present age and which must have been extremely perilous in ancient times. "Between Scylla and Charybdis," means to be confined to a choice between two dangerous situations.

Scythians, sīth'ī-anz. This name was very vaguely used by ancient writers. It was sometimes applied to a particular people, and at others was extended to all the nomadic tribes which wandered over the regions to the north of the Black and the Caspian Seas, and to the east of the latter. Scythia is used in the same indefinite manner, sometimes for the country of the Scythians, and sometimes for those now called Mongolia and Tartary. The Scythians may be distinguished into Asiatic and European. Among the former the ancients included a great number of northern nations, with whose origin they were unacquainted, and who were probably of different races. The Scythians were for some time a ruling people in Asia. They are considered as the progenitors of the Turks, Tartars, and Manchus: the ancients considered the Persians, Parthians, and Bactrians as their descendants. The European Scythians, in the time of Herodotus, inhabited the country from the Ister

(Danube) to the sources of the Dniester and the Dnieper, in the neighborhood of the Don, and along the northern shores of the Black Sea. Of this region that portion extending from the Danube to the city of Carcinitis was called Old Scythia, and the peninsula (Taurida) to the Borysthene was called Little Scythia, which name in Strabo's time included the country as far as the Danube, formerly occupied by the Thracians, and therefore comprised Old Scythia. The Scythians of Herodotus were Mongolians. They correspond with the modern Slavonians. They were anciently a nomad race. They were divided into hordes, the chief of which was called the Royal Scythians. To this horde all the others paid a sort of allegiance. In the time of the Roman Empire the name Scythian included the whole of the Mongol race, and extended over Northern Asia from the Volga to the frontiers of India. The people of this region, being little known, were the subject of numerous fables.

Sea. See OCEAN.

Sea-acorn, or **Acorn-barnacle**, a barnacle of the family *Balanidae*. See BARNACLE.

Sea'-anem'one, a popular name, having reference to their flower-like aspect, for certain polyps or coelenterate animals belonging to the suborder *Actinaria* of the order or class *Anthozoa*. The sea-anemones are sac-like animals of a more or less cylindrical form, usually fixed by a base or foot to some firm body, and with a disk at the opposite end in which is the slit-like mouth surrounded by whorls of simple hollow tentacles in greater or less number, but nearly always some multiple of six. From the mouth a short tubular gullet or oesophagus reaches into the cavity of the body, to the walls of which it is connected by radiating septa or mesenteries, which divide the body-cavity into a corresponding number of sacs, with all of which the oesophagus communicates by a central space into which the septa do not reach. A pair of ciliated grooves or siphonoglyphs extend along opposite sides of the oesophagus and into the corresponding corners of the mouth. These always remain open and are the seat of inflowing and outflowing currents of water, serving a respiratory function as well as for the transportation of waste matter from the body. The body-walls, as well as the tentacles, which are outgrowths from them, are very contractile and largely composed of muscles arranged in a circular and a longitudinal layer, the former serving for purposes of extension, the latter for retraction. These muscles have special relations to the mesenteries. The mesenteries are vertical radiating septa reaching from the mouth disk or peristome to the base, and from the body wall to the oesophagus, but below the level of the latter ending freely. They are not strictly radial in arrangement but are grouped in pairs almost always, like the tentacles, in some multiple of six. The mesenteries corresponding to the siphonoglyphs differ in structure from all of the others and are termed directive; the others form different classes according to the order and degree of development. The inter-mesenteric sacs may further communicate by one or two pores in each mesentery. Along the edges of the septa the testes and ovaries are developed from the cells lining the gastric cavity. Digestive cells are also

found in the same region as well as an area filled with stinging thread cells or nematocysts. In some species the latter are found in addition upon delicate threads or acontia which may be protruded through the mouth or cinclides.

Most of the anemones live singly, but some are colonial, in which case they never, like the closely related stone corals, form an internal limy skeleton, but may form a superficial one in the ectoderm. Generally they live attached to rocks or piles, but a few burrow in mud or sand, some as commensals fix themselves to shells inhabited by hermit crabs, etc., and a few are truly parasitic in jellyfishes. All are marine; most sublittoral, some deep-sea and a very few pelagic. They reproduce both asexually by budding and fission and sexually by eggs and spermatozoa, which are usually produced by different individuals. The eggs are fertilized in the gastric cavity and escape from the mouth in most cases as minute free-swimming larvæ or planulæ which soon attach themselves, develop mouth, tentacles and mesenteries, the latter in a definite order, until the adult structure is attained. Sea-anemones are carnivorous, but, having very limited powers of locomotion, are dependent upon such food as falls upon the expanded tentacles and peristome. This is captured through the paralyzing effect of the stinging cells or engulfed by the infolding tentacles and passed through the mouth into the gastric cavity for digestion, the undigested portion being rejected through the mouth. They will devour a surprising quantity of food and grow rapidly; and if starved, gradually shrink to almost the point of disappearance without losing their form. The species are quite numerous and are chiefly distinguished by the arrangement of the septa and tentacles, with color, form, etc., as minor characteristics. Most of them and particularly the tropical forms are beautifully colored. A large, handsome and variable species very common on the rocky shores of New England is *Metridium marginatum*, which makes an interesting inmate of the marine aquarium. Consult: Lankester, 'Treatise on Zoology,' Pt. II. (London, 1901); for American species, Parker, 'American Naturalist' (1900).

Sea-bass, a fish (*Centropristis striatus*) of the family *Serranida* (q.v.), also known as the black-fish, etc. It commonly attains the length of about a foot and a weight of 2 to 4 pounds, and is readily known by the large mouth with the teeth of moderate and nearly uniform size, the smooth area on top of the head, the rather large very rough stenoid scales, continuous dorsal fin with very strong spine and the slightly trilobate tail with a short filamentous tip to the upper angle. The color is mottled blackish with more or less evident parallel pale streaks. The sea-bass is well known along the entire Atlantic coast of the United States and is very common from Cape Cod to the mouth of Chesapeake Bay. It lives on rocky ledges wherever an abundance of food offers itself, and feeds voraciously upon all sorts of small crustaceans, fishes, squids, and other mollusks, etc. The sea-bass is a sluggish bottom-loving fish, but appears to be somewhat migratory. It spawns in June and the eggs are of small size and buoyant. During the summer large numbers of the young collect in the shallow bays, where eel-grass

grows in abundance. Owing to its abundance and the readiness and determination with which it takes the hook this is deservedly a favorite with anglers who lack the opportunity or skill to ope with nobler game. The fishing is done with hand-lines in from 5 to 20 fathoms of water, a heavy lead and a stout hook, preferably baited with squid, being required. Where they are plentiful two fish are frequently brought up simultaneously on as many hooks and large strings are taken during a single slack water, which is the time best suited to their capture. For the market large numbers of sea-bass are taken by lines and in pound nets on the coasts of New Jersey and Massachusetts. The firmness, whiteness and sweetness of its flesh makes this a table favorite, especially for chowder. The sea-bass is readily propagated artificially, but there has been no necessity for entering upon this work on a large scale. The name is also sometimes applied to various other more or less closely related species.

Sea-beans, very hard-shelled seeds of tropical plants carried by ocean currents, and deposited on various beaches, where they occasionally take root. Those washed up on the Florida sands take a high polish and are made into jewelry and souvenirs. The polished, marble-like, pale-gray seeds are those of a tall Central American shrub (*Casalpinia bonducella*); they are known in their native country as the nicker or bondué nuts, and are employed for necklaces and by Indian doctors as a tonic and vermifuge. Other common sea-beans are flattened, like lima beans, with a pitted or granular surface, and are of various sizes and hues, ranging through shades of red and brown to black or mottled. These are the fruits of species of *Mucuna*, climbing shrubs widely dispersed through the tropics, and very annoying to travelers, as the seed-pods are covered with stinging hairs, easily detached. The Queensland nut, the Kindal-Kindal of Australia, is a nutritious nut, the fruit of a small Australian tree (*Macadamia ternstroemia*) and so valuable as a food that no one is allowed to fell the trees. The seed is about the size of a hazelnut, with somewhat the same flavor. It is squarish, jet black, with a polished surface of iron-like hardness. The very large seed, known as the liver-bean, is so called from its color, and is the fruit of the *Entada scandens*, a woody climber of Australia, the West Indies and other tropical islands, bearing pods 2 to 4 feet long and several inches wide. The kernels of the seeds have been used for washing the hair and for laundering, and the shells are turned into snuff-boxes, etc.

Sea-bear. See SEAL.

Sea-blite. See GOOSEFOOT.

Sea-breams, fishes of the marine family *Sparidae*, represented in the United States by the sheepshead and its congeners. They are coast-fishes of moderate size, distributed throughout the warm and temperate parts of the world, and are usually of dark coloration. They are distinguished by the strength and elaboration of their teeth, fitting them for seizing and chewing crustaceans, mussels, and shellfish of all sorts. The fish most famous under this name is probably that of the Mediterranean *Chrysophrys aurata*, called gilthead in England, which sometimes reaches a weight of 20 pounds, and was one of the kinds fattened by the Romans of the classic

age, in fish ponds and regarded as especial delicacies.

Sea-buckthorn, or **Sallow-thorn**, a monotypic genus (*Hippophaë*) of the *Thymelæaceæ*, confined to temperate Europe and Asia, and diving near sea-coasts and alpine rivers. The single species, *H. rhamnoides*, is a thorny shrub, sometimes cultivated, especially for hedges near the sea, where it grows luxuriantly, preferring a sandy soil. The leaves are linear lanceolate, silvery in color; the flowers dioecious, with a tubular perianth that in maturity becomes succulent and encloses the seed, thus forming an orange-colored fruit which is agreeably acid. These berries are very abundant and are used for making fish-sauces, jellies and other condiments.

Sea-cocoanut. See **PALMS**.

Sea-coot, a gunners' name for certain dark-colored ducks, especially the American scoter (q.v.).

Sea-cow, a name often applied generally to sirenians (see **SIRENIA**; **MANATEE**), but especially restricted to the species formerly inhabiting the Pacific coast of Kamchatka, — Steller's sea-cow (*Rhytina stelleri*), now extinct. Structurally it differs from other sirenians in the total absence of teeth, the masticating surfaces of the jaws being merely horny pads, very dense and hard. The tail was lobed and the fore limbs small truncate paddles. This was a very large animal, attaining a length of 25 feet and being very bulky. It is now entirely extinct and was under the observation of white men for a bare quarter of a century. In 1741 the explorer Bering and the naturalist Steller discovered this great animal about the shores of two small islands, now known as Bering and Copper islands, in the extreme north Pacific Ocean. It is not known to have lived elsewhere and there is no proof that any examples have been seen since that killed in 1768. Steller has preserved an account of their habits and anatomy during the period when he was a shipwrecked resident of that inhospitable region. The animals were at that time very abundant in the shallow waters about the islands, where they fed upon the large sea-weeds which grow there so plentifully. They were extremely sluggish and inactive and of an unsuspicious, affectionate disposition. Upon Steller's return to Germany his discovery and suggestion that the flesh of these great sea-cows be utilized by explorers were published. Russian traders and trappers visited the islands in large numbers, and in the short space of time noted, exterminated this interesting animal.

Sea-cucumber, a holothurian (q.v.).

Sea-devil, a devil-fish (q.v.).

Sea-dove, the little auk. See **DOVEKIE**.

Sea-eagle, an eagle of the genus *Haliaëtus*, especially the white-tailed eagle or Erne (*H. albicilla*) of Europe. See **EAGLE**.

Sea-egg. See **EGG-URCHIN**; **SEA-URCHIN**.

Sea-elephant. See **ELEPHANT-SEAL**.

Sea-fan. See **GORGONIA**.

Sea-fir, a sertularian. See **CÖLENTERATA**.

Sea-fox, a shark. See **THRESHER**.

Sea-hares, a genus (*Aplysia*), of opisthobranchiate gastropod mollusks, in which the shell is either absent or very rudimentary, and is

concealed by the mantle. These animals are slug-like in appearance, and derive their popular name from the prominent character of the front pair of tentacles which somewhat resemble the ears of a hare. The side lobes of the mantle are used as fins, and are reflected over the sides and back of the sea-hares, these portions of the mantle thus concealing the shell. This latter structure, when developed, is of oblong, flexible, and transparent character. The gills are placed in the centre, and at the posterior portion of the dorsal surface of back; and four tentacles exist. Eyes are present, and are situated at the base of the hinder tentacles.

The sea-hares are widely distributed throughout most seas, and generally inhabit muddy or sandy tracts. The eggs are deposited in long strings. The food consists chiefly of sea-weeds, but they also devour small crustaceans, mollusks, and annelids. The mouth possesses thick muscular lips, and the stomach is of compound nature, consisting of a crop, muscular gizzard and accessory cavities. The sea-hares were notorious among the ancients for their supposed venomous properties, and formed ingredients in the poisonous compounds used of old to destroy enemies. Locusta is thus said to have used them against the enemies of Nero; and they formed ingredients in the draught prepared for the tyrant himself. Domitian was similarly suspected of administering the poisonous *Aplysiadæ* to his brother Titus. And when Apuleius was accused of practising magic a chief proof against him was the fact that he had employed fishermen to obtain sea-hares for him. These animals, however, are harmless so far as poisonous properties are concerned, except that some species exude an acrid liquor irritating to the human skin. The "lernæa" (*Aplysia leporina*) of the Bay of Naples has an evil reputation among fishermen for causing pain and sickness when touched. The sea-hares also emit a fluid of a rich purple hue, which, like the ink of the cuttle-fishes, has the property of diffusing itself quickly throughout the surrounding water. Gosse mentions that a West Indian species of *Aplysia*, on being put into a basin of clear sea-water, emitted sufficient of this purple secretion to tinge deeply the whole of the water within a few minutes.

Sea-horse, a small fish of the genus *Hippocampus*, in which the head bears a close resemblance to that of the knight in chess. They belong to the order *Lophobranchii* and the same family (*Syngnathidæ*) as the pipe-fishes (q.v.). From the latter, and indeed from all other fishes, they differ in having a prehensile tail, which is long, tapering, and quadrate in section, owing to the integument of angulated, bony plates, and lacks altogether the caudal fin. The body is compressed, curiously prominent below, protected by rings of spinous bony plates, and bears small pectoral, dorsal and anal fins. In addition to its form the head is remarkable in being supported at right angles to the body-axis on a neck-like construction. Like other parts it is protected by tuberculated or spiny bony plates. A prolonged snout bears the small toothless mouth at its end. The gills are tufted and their arches and covers poorly developed. About half-a-dozen closely similar species are found in our waters, the best known of which is *H. hudsonicus* found in shal-

SEA ISLANDS — SEA-OTTER

low bays and estuaries along the Atlantic coast as far north as Cape Cod. There is no more interesting inmate of the marine aquarium than the sea-horse, which twists its tail about the stems of sea-plants, among which it seeks concealment or swims slowly in a very unfishlike attitude, with coiled tail, upright in the water. As in the pipe-fishes the eggs are protected until hatched in a brood-pouch at the base of the tail of the male. Other species occur in the warm waters of the Gulf of Mexico and California. A remarkable related genus is *Phyllopteryx*, of Australian seas, which bears numerous long cutaneous streamers closely mimicking the seaweeds among which the animal dwells.

In symbolic and heraldic art a "sea-horse" appears as a fabulous marine animal with foreparts like those of a horse, and with hinder parts like a fish. Neptune is depicted as using them to draw his chariot. In the sea-horse of heraldry, a scalloped fin runs down the back. In biblical literature and early books generally the term often refers uncertainly to the walrus or to the hippopotamus.

Sea Islands, the islands off the coast of South Carolina, south of Winyah Bay. They are a chain of low, flat islands noted for their fertility. The principal islands are Hilton Head, Port Royal, Saint Helena, Edisto, Johns, and James. The quality of the long fibred "Sea Island cotton" is famous, and the rice product is large. In 1893 and in 1894 a hurricane visited several of the islands, inundating them with the waves of the sea, and destroying the crops.

Sea-kale, a cruciferous, large-leaved perennial (*Crambe maritima*) indigenous to the coasts of Europe. It has glaucous cabbage-like foliage, and clusters of showy white flowers, and is cultivated in rich soil for the young shoots and unfolded leaves, which are blanched and eaten as spring vegetables, like asparagus.

Sea-lamprey. See LAMPREY.

Sea Lavender, a name common to various species of *Statice* (q.v.), and to the closely allied *Limonium carolinianum*, a North American sea-coast plant. The latter has very long, thick, rootstocks, which are employed as an astringent drug; tufts of radical, oblanceolate fleshy leaves, and wide-spreading panicles of 5-merous, lavender-lined, tiny flowers, standing erect. This sea-lavender, or marsh rosemary, as it is also called, often grows over such large areas that the marshes seem covered with low hanging blue mist. The flower panicles, when dried, are often used as winter ornaments, since they keep their form and color. It is called marsh-beet in England from its purplish root, and was the red beben of early druggists.

Sea-lemon, a shell-less mollusk of the nudibranch family *Doridæ*, of cosmopolitan range. The body somewhat resembles a lemon in color, showing a beautiful plume-like tuft of gills (when expanded) on the back. These mollusks are carnivorous, feeding on zoophytes, crustacea, etc., and live under stones on the beach, usually near low-water mark. The eggs are emitted embedded in broad gelatinous ribbon-like masses, which may be found attached to the fronds of seaweeds. These "spawn-coils," as they are named, include immense numbers of eggs. Darwin estimated that upward of 600,000

ova were contained in a coil found at the Falkland Islands.

Sea-lettuce, the delicate, thin, waving fronds of *Ulva lactuca*, a pale green sea-weed.

Sea-lily, a crinoid (q.v.), especially a living example, as *Pentacrinus*; fossil crinoids are often called stone-lilies.

Sea-lion. See SEALS.

Sea-mat, or **Horn-wrack**, a colony of polyzoans (see POLYZOA); specifically, on British shores. Some species of *Flustra*, as the broad horn-wrath (*F. foliacea*).

Sea-mink, one of the names of the kingfish (*Menticirrhus americanus*). See KINGFISH.

Sea-mouse, a free-moving marine annelid of the family *Aphroditidae*, the most highly organized of "the world of worms." The body is oval, the head is provided with tentacles and two eyes, and the back is covered with scales, which, by their expansion and contraction, provide for the admission and expulsion of water from the gills or branchiæ, situated beneath them. The most notable feature of these animals, however, is the beautiful iridescent hues exhibited by the hairs, which, as in other *Errantia*, fringe the sides of the body. The setæ of *Aphrodite*, even preserved in spirits of wine, still give out these brilliant hues. These animals inhabit deep water, and may be obtained by dredging, although they are frequently cast up on shores after storms. Various genera and species exist, some of which are North American. Consult Verrill, 'Zoology of Vineyard Sound' (1875).

Sea-onion, a squills. See SCILLA.

Sea-otter, a fur-bearing animal (*Lutra lutris*) of the weasel family (*Mustelidae*), and in its webbed hind feet and aquatic habits resembling the true otter, with which it is united zoologically in the subfamily *Lutrine*. The sea-otter is of a robust build, about four feet long, with a short blunt tail, short limbs, small fore feet and large, fully-webbed hind feet. The ears are small and the broad muzzle bears spreading tufts of stout bristles. There are but two incisor teeth on each side of the lower jaw and the molar and premolar teeth are remarkable for their massiveness and the bluntness of the cusps. The inner fur, which is very soft, dense and woolly, is deep brown or, in old animals black, the longer white-tipped hairs being scanty on the body, to which they impart a hoary aspect, but more abundant on the yellowish or grayish head and neck. Sea-otters were formerly very abundant on rocky shores and islands of the North Pacific on both the American and Asiatic sides. The natives of the Aleutian islands clothed themselves in their skins, but with the increased demand for the fur in China, Europe and America, and especially among the Russian nobility, their unremitting pursuit by native and white hunters has rendered them one of the rarest and most valued of fur-bearing animals. In greatly reduced numbers they are still found in Alaska and within the United States on a very limited reach of the Oregon coast. The otters are now found especially on the island-like masses of the giant bladder kelp or sea-weed and much persecution has made them exceedingly shy and wary. They are strictly marine and never leave the

SEA-PEN — SEA-SIDE GRAPE

vicinity of water. Their food consists of various kinds of crustacea, mollusks and sea-urchins, which are easily crushed between the blunt massive teeth which are not at all adapted to a fish diet. A single young is born at a time and at any season, and is nursed by the mother as she lies on her back in the water. A century ago a single trading company secured as many as 15,000 skins valued at \$1,000,000 in one year, but now the annual production of all the hunters would not exceed 5,000, and single skins are worth \$150 to the hunter and \$1,000 or more at the final market. Formerly they were taken in nets, or shot, speared and clubbed; but now are usually shot with rifles either by the natives from boats or while patrolling the beach, or from observation tripods erected by white hunters on the shores. The Alaskan fishery is now regulated by law. Consult: Elliott, 'Report on Alaska' (Washington 1875); Coues, 'Fur-bearing Animals' (Washington 1877).

Sea-pen, an alcyonarian coral of the family *Pennatulidae* (class *Actinosozoa*). It is a compound organism, which consists of a main stem with lateral pinnae or branches, forming a feather-shaped community. The lower end of the stem is fleshy, destitute of polyps, and contains an internal coral-rod, by which the sea-pens attach themselves loosely to the mud of the sea-bed. In color they are reddish-purple, the lower extremity being of a bright orange hue. The branches are studded on their upper margins with the individual polyp, which are connected together through the fleshy medium or cœnosarc. These organisms are common in all the warm seas.

Sea-raven, a large and very spiny and irregular sculpin (*Hemitripterus americanus*), common about rocky shores and reefs from the Arctic coasts to Cape Cod. Compare SEA-ROBIN.

Sea-robin, a popular name for certain of the gurnards (*Triglidae*) in allusion to their generally reddish color and large wing-like pectoral fins. They have rather large heads, encased in bony plates and with flattened snouts, and elongated tapering bodies covered with small scales. The pectoral fins are very large and spreading and are especially remarkable in having the three lowermost rays separated from the fin-web and free from one another; they are somewhat enlarged, provided at the end with special organs of touch and are used much like so many fingers to feel the bottom, turn over stones and other small objects and to detect the presence of food. Numerous species of the genus *Prionotus* inhabit American seas, especially southward, the best known of which are the short-winged sea-robin (*P. carolinensis*), with the pectoral fins red and less than half as long as the body and the long-winged sea-robin (*P. strigatus*) with the pectorals brown and more than half as long as the body. Both are common as far north as Cape Cod and the former in Massachusetts Bay also. The sea-robins are extremely interesting to watch, as they turn over small objects on the bottom with their tactile rays in search of the small fishes and crustaceans upon which they feed. Large numbers are caught upon lines and in nets, but though the flesh is white and very excellent, they are not considered to be a food-fish. Several related species are found on the

Pacific coast, and elsewhere, and some are called flying-fish.

Sea-serpent, a more or less mythical sea-monster of serpentine form and reputed gigantic size, whose appearance has been reported at varying intervals and in many seas from the earliest times. The existence of a definite species of serpent of this sort is firmly believed in by most sea-faring men, many of whom have observed confirmatory appearances. In a large number of instances these have been quite satisfactorily explained as tide-rows of sea-weed, etc. moved in an undulating fashion by wave action; as schools of porpoises moving in single file, as giant squids swimming at the surface with their serpentine arms trailing behind, or in a variety of similar ways. There remain, however, a number of accounts whose circumstantiality and general agreement, together with the trustworthiness of the narrators, are such that many zoologists are convinced of the existence of such a monster, and few are willing to deny it, although, in the absence of direct proof, a scientific skepticism prevails. That large fishes of serpentine form live in the open ocean is well known and these may prove to be the foundation of many of the sea-serpent stories. Among these are the ribbon-fishes (*Regaleidae*) of which a number of species have been described. They have elongated, compressed, tapering bodies with oblong heads and toothless jaws and a continuous dorsal fin for the entire length, rising on the head into a prominent crest. Specimens of these fishes exceeding 20 feet in length have been actually washed ashore and examined by naturalists, and others of much larger size have been observed swimming swiftly at the surface, presenting a veritable sea-serpent aspect. One has been taken in the Bermudas, another on the coast of California and perhaps a score on other shores, while many more have been seen alive. The ribbon-fish is supposed to live in the depths of the sea and to come to the surface only occasionally. A slender eel-like shark (*Clamydose-lache*) also lives in the deep waters of the Pacific, and if it attains a large size might justify reports of sea-serpents seen in that region. In past ages huge serpent-like creatures did actually roam the high seas, and some naturalists have considered the possibility of some of these persisting in the oceanic abysses down to the present times. The most important of these were the mosasaurs (*Pythonomorpha*), rather closely related to true serpents. During the Cretaceous period they were widely distributed, and some reached a length of 60 or 70 feet and were extremely elongated and slender, with pointed heads and two pairs of paddle-like limbs.

The only true marine serpents of the present day are the sea-snakes (*Hydrophidae*), which live in warm seas of most parts of the world, often far from land. All are of small size, with compressed tails, and are very venomous. They feed on fish, are viviparous and produce their young among the rocky shores of islands, etc.

Consult: Goode and Bean, 'Oceanic Ichthyology' (Washington 1875); Gunther, 'Challenger Reports,' Vol. XXII. (London 1887); Boulenger, 'Natural Science' (1892); and Lee, 'Sea Monsters Unmasked' (London 1883.)

Sea-side Grape, a small tree (*Coccoloba uvifera*) of the *Polygonaceæ*, which grows on the

sea-coasts of Florida and the West Indies. It has clusters of edible fruit somewhat resembling currants, and a beautiful hard, violet-colored wood, which produces a red dye and a juice known as West Indian kino, that is nearly as valuable as the official kino.

Sea-slug, a nudibranchiate mollusk. See NUDIBRANCHIATA.

Sea-snake, a venomous, marine East Indian serpent of the numerous family *Hydrophilidae*. See SEA-SERPENT.

Sea-spider, a spider-like "no-body crab" of the class *Pantopoda* (q.v.); also, a spider-crab (q.v.).

Sea-squirt, an ascidian or tunicate (qq.v.), so named from the habit of emitting jets of water from the orifices of the body when touched or irritated in any way. Other less apt names found in British books are, sea-pear, sea-pork, etc.

Sea-swallow. See TERN.

Sea-trout, a popular name for various fishes, primarily for the common salmon-trout (*S. trutta*) of British waters. In other parts of the world various fishes more or less resembling it are called sea-trout, as the weakfish (q.v.) in the Southern United States.

Sea-urchin, an echinoderm of the class *Echinoidea* (q.v.), members of which differ from crinoids or starfishes in their compact spheroid, discoid or heart-shaped forms without arms or a stalk. The numerous species differ greatly in the number and arrangement of the calcareous plates forming the continuous test, and in the character of the spines and other appendages with which the latter is studded. Of both fossil and living forms about 250 genera and 4,000 species are known. Although representatives of the 400 or so living species occur in most seas they are more numerous in warm waters, the West Indian fauna being the richest in the world. Regular sea-urchins are distributed widely in the littoral zone, but the irregular ones are especially characteristic of deep waters and the southern oceans, some of them extending to the utmost abysses. The shallow-water forms being subjected to the constant beating of the surf along the rocky shores which they chiefly inhabit are provided with a highly developed system of suctorial ambulacral feet, by means of which they are enabled to retain a hold. Many species also possess the remarkable power of boring into solid rock in which they excavate chambers exactly fitting them, and increasing in size with their growth. Frequently the orifice representing the earlier dimensions of the chamber is too small to permit the urchin's escape and the animal is at once imprisoned in its cave and protected from any possibility of injury by the beating waves. The long-spined *Diadema* thus completely honeycombs the surface of the coral rock of the Bahama Islands, etc. Although this power of excavation is most displayed on soft calcareous rocks, the fact that solid granite is similarly bored in some parts of the world shows that it is not the result of a solvent action, but of a slow wearing away of the rock by the jaws and constant movements of the spines. Sea-urchins of most species swallow rock debris and sand in large quantities, digesting the abundant minute animal and plant life which it contains. Most

of the species are gregarious, vast numbers collecting in certain areas on the sea-floor until their bodies completely pave the bottom. During the reproductive season, usually the summer, the ovaries and testes, found in separate individuals, become so greatly enlarged that they fill almost the entire interior of the test. Such forms are called sea-eggs, and this name is sometimes applied to regular sea-urchins generally. In some countries they are baked and eaten while in this condition. The egg-urchin (*Hipponoe esculenta*) of the West Indies is a large species so utilized. But very few species of sea-urchins are found in the shallow waters of the Atlantic coast of the United States. The green sea-urchin (*Strongylocentrotus drobachensis*) is very common on the rocky shores of New England and the Pacific States. Besides the diatoms, etc., which it digests from the sand that it swallows, it also devours dead animals of every kind. Another example of the regular urchins is the purple or deep brown *Arbacia punctulata*, which is provided with very stout spines and is found from Cape Cod to the Gulf of Mexico. The species of *Diadema* and *Toxopneustes* occur only in the South Atlantic States. Of the flat or cake urchins (*Clypeasteroidea*) the sand dollars (*Echinarachnius parma*, and *Mellita testudinata*) are examples. Both live in great numbers buried in the sand or lying on its surface on shoals, the first being most plentiful northward, the last southward. The heart urchin (*Mora atrapas*) is the only example of the *Spatangoidea* that reaches even as far north as North Carolina in shallow water. Many interesting species of this and the other groups have been dredged in the deep water along the continental slope and elsewhere.

Consult: Agassiz, 'Revision of the Echini' and subsequent articles in the *Memoirs Mus. Comp. Zool.* (Cambridge 1872); Lang, 'Lehrbuch der vergleichenden Anatomie' (Jena 1894); Agassiz, 'Seaside Studies' (Boston 1871). See ECHINODERMATA; ECHINOIDEA.

Sea-whip. See GORGONIA.

Seabury, sē'bū-rī, Samuel, American Protestant Episcopal bishop: b. North Groton, Conn., 30 Nov. 1729; d. New London, Conn., 25 Feb. 1796. He was graduated at Yale College in 1748, and three years later took a course in medicine at the University of Edinburgh. He did not, however, practise this profession, but entered at once upon a course of theological study. He was ordained deacon and priest in the English Church in London in December 1753. Returning to America in the following summer, he became rector of Christ Church, New Brunswick, N. J. In 1757 he took charge of Grace Church, Jamaica, L. I., and in 1766 of Saint Peter's, Westchester, N. Y. In the autumn of 1775 he was obliged on account of his loyalist sympathies to leave his parish and he consequently resided, during the greater part of the war, in New York. He wrote numerous articles in support of the Tory cause, of which he was considered one of the ablest advocates, and suffered much, even to imprisonment and exile, for his loyalty to the king, though when peace was finally declared, no one was more sincerely faithful to the government of the United States. Immediately after the articles of peace were received in New York, 10 out of the 14 Episcopal clergy then ministering in Connecticut assembled

at Woodbury to consider what action should be taken as to the organization of the Church under the changed civic conditions. On the first formal ballot, they elected Dr. Seabury as bishop. He then sailed for England, and waited in London more than a year in the hope of obtaining consecration from the English bishops. Owing to the connection between the Church of England and the state, various political reasons stood in the way, and he finally determined, in pursuance of his original instructions, to apply to the Scottish bishops, who were in a more independent position. They determined to proceed; and on 14 Nov. 1784, Seabury was consecrated at Aberdeen by the bishop and coadjutor-bishop of that see and the bishop of Moray and Ross. He landed in Newport, R. I., on the 20th of the following June, and, in addition to his episcopal duties, assumed the rectorship of Saint James' Church, New London, which he held until his death. His jurisdiction was recognized as extending over Rhode Island as well as Connecticut and afterward over Massachusetts; but the validity of his consecration was strenuously denied by many, partly, it would seem, owing to the prejudice excited by his former political attitude. In 1789, however, it was expressly affirmed by the General Convention. Seabury exercised much influence on the final shape assumed by the constitution and liturgy of his Church, especially (in accordance with his agreement with the Scottish bishops) by insisting on the restoration of the oblation of the elements and invocation of the Holy Ghost in the Eucharistic office. He was a man of pronounced views, but of great simplicity, humility, and self-sacrifice; and the value of his services to the infant Church can scarcely be over-estimated. Consult: Beardsley, 'Life and Correspondence of Samuel Seabury' (1881); Tyler, 'Literary History of the American Revolution' (1897).

Seal, an engraved stamp bearing a device or inscription pertaining to the owner; also, the impression of such a stamp on a plastic substance as wax. A seal upon a document was originally a substitute for a signature; a seal upon a place of deposit answered the purpose of security in a different manner from a lock. The use of seals is of the highest antiquity, and one of the earliest and commonest forms is the signet-ring. In Egypt impressions of seals were made in fine clay, and attached to documents by slips of papyrus. The Romans used clay, bees'-wax, and in the time of the empire lead for taking impressions. The use of bees'-wax was introduced by the Normans; sealing-wax was invented in the 17th century. Documents in England are still sealed in compliance with legal formality, but the true voucher to which alone any real importance attaches is the signature. There are three seals officially used in England by or in name of the sovereign — the great seal, the privy seal, and the signet. In the United States on 4 July 1776, Congress appointed Benjamin Franklin, John Adams, and Thomas Jefferson a committee to prepare a device for the great seal of the United States. The committee reported various devices during several years. William Barton, of Philadelphia, was appointed to submit designs. Sir John Prestwich, an English antiquarian, suggested a design to John Adams in 1779. Combining the various designs of Barton and Prestwich, a seal was adopted

20 June 1782. Arms: Paleways of 13 pieces argent and gules; a chief azure; the escutcheon on the breast of the American eagle displayed proper, holding in his dexter talon an olive branch and in his sinister a bundle of 13 arrows; and in his beak a scroll with the motto: *E Pluribus Unum*. Crest: a glory breaking through a cloud proper and surrounding 13 stars. Reverse: A pyramid unfinished. In the zenith an eye in a triangle, surrounded with a glory proper, over the eye the words, *Annuit Cœptis*. Beneath the pyramid, MDCCLXXVI and words, *Novus Ordo Seclorum*. The Confederate seal, adopted by the Confederate Congress, 30 April 1863, was designed by Thomas J. Semmes, of Louisiana. The device represents an equestrian portrait of Washington, surrounded by the principal agricultural products of the Confederacy.

Seal Islands. See LOOS.

Seal Skins. See FUR TRADE, THE.

Seal of Solomon, Order of. See ORDERS, ROYAL.

Seal of the United States, Great. See UNITED STATES, GREAT SEAL OF THE.

Sealing-wax, a resinous preparation used for securing folded papers and envelopes, and for receiving impressions of seals set to instruments. Ordinary red sealing-wax is made of pure bleached lac, to which when melted are added Venice turpentine and vermilion. Inferior qualities consist of a proportion of common rosin and red-lead, and black and other colors are produced by substituting appropriate pigments. Sealing-wax was invented in the 17th century. Its use for sealing letters has been generally given up in favor of mucilage, which when moistened fastens envelopes much more effectively and with immeasurably greater rapidity than sealing-wax.

Seals. Under this term are usually grouped two very widely different types of animals, the so-called fur seals and the hair seals or true seals. The former are not properly seals at all, but are allied rather to the bears, and were appropriately called "sea-bears" by their discoverers. The fur seal yields a valuable fur; the hair seal has no fur, but a valuable oil is obtained from its fat and leather from its hide. The principal habitat of the hair seal is in the North Atlantic and Arctic oceans, although small groups of the commoner species are found widely scattered over the globe. The fur seals are more or less widely distributed throughout the southern seas, but are found at the present time chiefly in the North Pacific Ocean and Bering Sea. They are not found in the North Atlantic. The hair seal belongs to the suborder of the *Pinnipedia* and has feet not truly plantigrade, short with long claws. The posterior limbs only are used in swimming and are not susceptible of bending forward at the knee. When on land the animal cannot walk or run, but merely wriggles with a belly-wise motion, the neck being short and the head scarcely capable of being raised. There is no external ear. The fur seals belong to the suborder of the *Gressigrada*. The feet are plantigrade, the anterior limbs only being used in swimming, having rudimentary claws, if any. The head and neck can be raised as in the bear. The external ear is moderately developed, and the animal can run or lope along the ground as do ordinary mam-

SEALS

mals and with considerable rapidity. The internal structure of the two animals shows equally marked differences. The hair seals, whatever their origin, must have come from a different parent stock and their relation to land carnivora must be more remote. Beyond the fact that both are carnivorous mammals, feeding on fish and perfectly adapted to life in the water, the two animals have little in common. In both the thick blubber goes with life in the icy waters of the north. They resort, in one case to certain island shores, in the other to the ice floes, to bring forth and rear their young. But these resemblances, associated with aquatic habitat, are only analogies and have no value in scientific classification. In structure, appearance, degree of intelligence, habits, disposition, and method of locomotion, the two types are entirely distinct and their evolution as pelagic animals has been along separate lines.

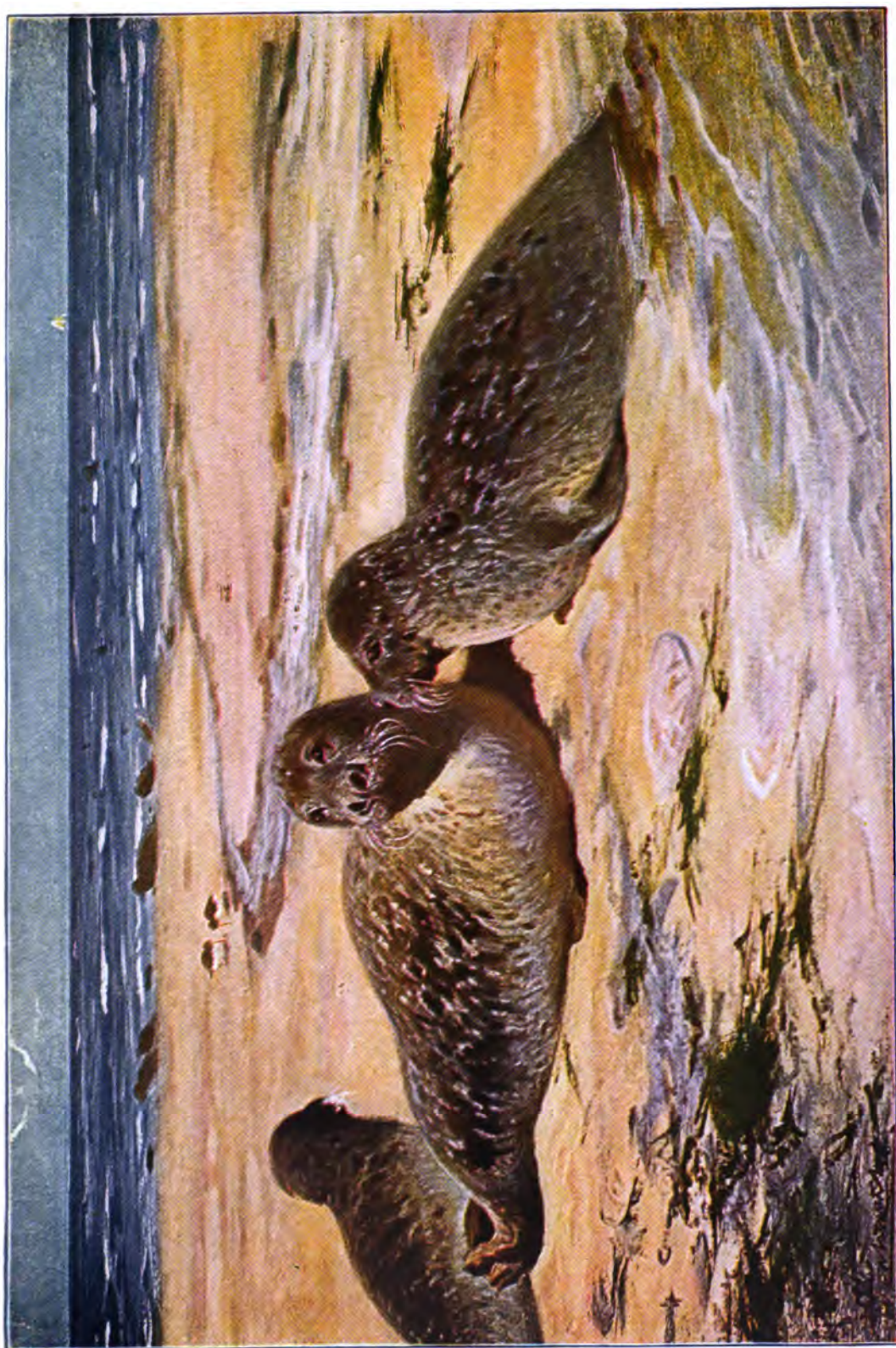
Hair Seals.—The hair seals are found off the coasts of Newfoundland and Labrador, in the waters of the Gulf of Saint Lawrence, in the Greenland seas, and about the island of Jan Mayen, and in the White and Caspian seas. In these places they occur in sufficient numbers to make their hunting profitable. In small isolated groups they are found about the British Isles, among the pelagic islands of the southern seas, and about the island shores of the Pacific Ocean and Bering Sea. The principal species hunted are the saddleback or harp seal (*Phoca granlandica*), so named from the peculiar marking thought to resemble an ancient harp; the rough or ringed seal (*P. fatida*), having its name also from color markings; the harbor or common seal (*P. vitulina*), so-called because of its wide distribution and its fondness for bays and sheltered waters; the Caspian seal (*P. caspica*), confined to the sea of that name; the hooded seal (*Cystophora cristata*), so named because of its crest or hood; and the gray seal (*Halichærus grypus*). The two last are unimportant, being taken only when met with in search for other seals. The harbor seal is the commonest form and most widely distributed. But the most important in point of numbers and value of its products is the harp seal, the seal of Newfoundland, of the Greenland seas, and the Arctic.

The hair seals show considerable variation in size and coloration. The harp seals are in general whitish or yellowish-white, the nose and head black, the throat and chin spotted with black. The harbor seal is yellowish-gray above, varied with irregular spots of dark brown or black, and yellowish-white beneath with smaller spots. The ringed seal is the smallest form, the gray seal the largest, attaining a length of eight to nine feet. The ordinary species are from five to six feet in length and weigh from 60 to 300 pounds. The female is slightly smaller than the male, in the case of the harp seal about one fourth less; but there is no such wide disparity between the sexes as exists in the case of the fur seals. The animals are said to be monogamous. With the exception of the harbor seal, which is non-migratory, the hair seals obey a more or less well defined semi-annual migration, although their movements are nowhere so definite as those of the fur seals of the North Pacific Ocean. In a general way the herds move southward on the approach of winter, returning to the north and eastward in the spring as the

ice recedes. They are found, however, with unfailing regularity at certain definite localities in the breeding season, as for example, the ice fields off Newfoundland and about Jan Mayen Island. In the vicinity of Newfoundland the young are born between the middle of February and the latter part of March. At Jan Mayen the season is somewhat later, approaching April. The single young, whitish in color at birth, changing to darker, grows very rapidly, attaining a weight and size approximating that of its mother in six weeks or two months. It remains on the ice, the mother returning from her feeding excursions to nourish it. In the course of a month it takes to the water, reluctantly at first, finding it necessary to learn to swim. The young seals form the most valuable part of the catch and yield the best quality of oil. The food of the hair seal consists of fish, in certain species supplemented by mollusks and crustaceans.

Of the various sealing grounds or districts, by far the most important is that of Newfoundland, to which the seals flock in February of each year in "countless numbers." The sealing fleet clears principally from the port of Saint Johns, sailing vessels being allowed to depart as early as March 1st, steam vessels on the 10th, and to begin sealing as soon as the seals can be found. The sealing season extends until the 1st of May. In addition to the sealing on the ice the hunting is also carried on by means of nets and guns along the shores of Newfoundland and the Gulf of Saint Lawrence. This form of sealing has been practised from the earliest times and constituted the beginning of the industry, which, however, attained no considerable importance prior to the beginning of the 19th century, the yearly catch probably not exceeding 5,000 seals. Vessels seem to have been first used in this sealing in the year 1763. For the year 1805 we have record of a catch of 81,000. We know that in 1807 the sealing fleet numbered 30 vessels. The catch for 1815 was 126,000 and that for 1822, 306,000. In the period from 1830 to 1850 the Newfoundland sealing industry was at its maximum development. The fleet numbered approximately 400 vessels, with crews aggregating 10,000 men and an annual catch ranging from 500,000 to 700,000 seals. From the close of this period the industry declined, and fewer but larger vessels were employed. In 1871 we find the fleet reduced to 168 vessels. The catch for 1856 was 361,000. It rose again in 1876 to the 500,000 mark, but in 1880 it fell to 223,000. Since that time it has apparently held its own, the annual catch fluctuating between 200,000 and 400,000. The Newfoundland sealing is essentially a British industry, the major part of the fleet hailing from the ports of Saint Johns and Conception Bay, the English vessels from Dundee and Peterhead. The principal species taken in this catch is the saddleback or harp seal (*Phoca granlandica*), which constitutes also the bulk of the catch in the Jan Mayen and Greenland sealing.

Next in importance comes the sealing in the vicinity of Jan Mayen Island. This is confined to an area of about 400 miles diameter about the island. The seals arrive in this region somewhat later and some British vessels, after completing the Newfoundland season, go on to Jan Mayen. This sealing is also participated in by German



COMMON HARBOR SEAL (*Phoca Vitulina*)

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and Norwegian vessels, the former sailing from Hamburg, the latter from Tönberg and Tromsø. The area covered is so limited that this sealing is very destructive. In 1876 it became necessary to establish a closed season for the Jan Mayen sealing, which was accomplished by an agreement among the nations concerned by which sealing in the area between lat. 67° and 75° N. and lon. 5° E. and 17° W. should not begin before April 3. The records for the Jan Mayen sealing extend back to 1720. The catch by a fleet of 19 vessels from Hamburg in 1760 is said to have been 44,000. For 1790 the catch was 45,000; for 1850, 48,000. We learn that in 1868 a fleet of 15 Norwegian vessels, carrying 600 to 700 men, took part in this sealing, the catch for five years preceding this date being approximately 65,000 a year. The British fleet has been smaller, ranging, in the period 1865 to 1871, from 4 to 12 vessels, taking a catch of from 16,000 to 90,000. The best estimates available for the total catch of the Jan Mayen sealing for this period would seem to be about 200,000 seals a year. Since 1880, despite the regulations, this sealing has greatly declined. The statistics for the German and Norwegian vessels are not available, but those for the British fleet are given each year by Thomas Southwell in the 'Zoologist' (London). From this source we learn that the catch for 1881 was 27,894; for 1885, 26,448; for 1887, 1,100; for 1889, 15,079; and for 1891, 1,560. Since 1895 the Jan Mayen sealing has been abandoned by the British fleet.

On the west coast of Greenland a considerable catch of seals is made by the natives. The flesh of the animals is sought for food and the skins for clothing, and they form the chief resources of the inhabitants of the region. The product of this sealing formerly, according to Dr. Rink, in his account of Greenland, averaged about 89,000 seals each year. In recent years it is said to have fallen off to about one half, probably from the same cause that has affected the Jan Mayen sealing.

At Nova Zembla and in the White and Caspian seas are important sealing grounds worked by the Russians. Professor Schultz in his account of the seal and other fisheries of these waters speaks of the White Sea sealing as covering an area of 230 miles and engaging 2,000 hunters. The methods of sealing and the species sought are the same as in the North Atlantic. The catch has been estimated at from 65,000 to 75,000 a year. The Caspian Sea sealing is more important, the annual catch for five years prior to 1882, as given by Professor Schultz, was 130,000. Statistics regarding the results of sealing in the White and Caspian seas in recent years are not available.

The methods employed in taking the seals vary with the different conditions under which the animals are found. Along shores of Newfoundland nets and sealing frames are used. A common form of net is one making with the shore an oblong enclosure, the ends capable of being lowered as the animals approach and raised after they are within. They are then frightened until they have hopelessly entangled themselves in the meshes of the suspended net. Two men manage such a net, which may be as much as 150 fathoms in length and in a single such net 1,800 seals are said to have

been taken in one season. The natives of Greenland use the net also, but employ chiefly the harpoon or spear with wooden shaft and detachable head, the latter secured to the boat by means of a cord by which the captured animal is drawn up to the hunter and despatched with the club or knife. Stationary nets are also used in connection with the rocks where seals are accustomed to haul out to rest and also about their breathing holes in the ice. Dead-falls, sealing hooks, and other devices are used as circumstances warrant. But the really important method of capture is that used upon the ice fields where the seals are found congregated in immense herds. When a vessel has sighted seals its hunters are put ashore on the ice. They round up the animals, cutting them off from the open water and then club them over the head. When the seals are all killed the hunters remove the skins, with the adhering layer of blubber, and drag them back to be stored in the ship. This process is repeated day after day, until no more seals are to be found, or a cargo is obtained. At port the fat is separated from the skin and the latter preserved by salting. The fat is rendered into oil. In former times this was accomplished by throwing it into huge vats to melt by its own weight under the action of the sun and weather. In recent years this method has been replaced by the more rapid one of rendering by steam. The oil thus obtained is used as a lubricant and luminant and in the manufactures. The hides are made into leather and used for a variety of purposes, among them the covering of trunks and knapsacks.

The vessels used in the sealing industry were originally small sailing schooners. Steam vessels began to be used about 1866, and have gradually superseded the sailing vessels. Of the fleet of 107 vessels of 1873, one fifth are said to have been steamers. At the present time steam vessels are employed almost exclusively in the Newfoundland and Jan Mayen sealing. The ships must be staunchly built with iron-shod prow for breaking through the ice and with strength to withstand the pressure when caught in the shifting ice. The business is a hazardous one, vessels not infrequently being wrecked by storms or ground to pieces between the icebergs. Vessels sometimes fail to come up with seals and so return empty. But the catches are in the main good and at times exceptionally so. Catches of 30,000 to 40,000 seals are not infrequent for single vessels, and each animal is worth from one to three dollars, a rich booty for a season of from six weeks to two months. In the case of steam vessels the men of the crew share one third of the catch among them, two thirds going to the owners of the vessel. The catch is divided equally between crew and owners in the case of sailing vessels.

It is not easy to bring together in any complete way the statistics of the hair-seal industry. For the period, 1881 to 1901, Mr. Southwell, in his annual notes in the 'Zoologist' on the 'Seal and Whale Fishery,' gives rather complete data for the British fleet taking part in the Newfoundland and Jan Mayen sealing. His figures do not, however, include the shore hunting and the seals taken by sailing vessels. The following table is compiled from his annual notes:

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CATCH OF STEAM SEALING VESSELS OF THE BRITISH FLEET.

Year	Greenland sealing		Newfoundland sealing	
	Vessels	Catch	Vessels	Catch
1881	..	23,894	13	139,985
1882	8	22,142	13	63,204
1883	13	37,920	31	286,000
1884	12	39,700	20	192,175
1885	10	26,448	19	211,587
1886	3	4,500	18	195,396
1887	1	1,100	20	177,733
1888	4	13,388	16	210,810
1889	4	15,079	19	393,287
1890	7	6,603	19	209,000
1891	5	1,560	19	343,495
1892	5	3,478	20	349,369
1893	3	325	22	129,060
1894	3	4,712	21	152,821
1895	..	.....	20	270,058
1896	..	.....	20	185,516
1897	..	.....	21	126,628
1898	..	.....	18	241,708
1899	..	.....	18	268,787
1900	..	.....	19	353,276
1901	..	.....	19	345,380

Of the value of the total product of the industry various estimates are available. The catch of 1857 of 500,000 seals is valued at \$2,125,000. This sum was divided among 375 vessels and 13,600 men. The catch of 1871 of 486,262 seals is said to have yielded 6,943 tons of oil valued at \$972,000, the skins themselves being valued at \$486,262, making a total of \$1,458,262. These figures related to the Newfoundland catch. For the years 1895-1901, Professor Southwell gives the following estimates for the catches of these years as shown in the preceding table:

1895.....	£77,824
1896.....	55,362
1897.....	34,564
1898.....	80,000
1899.....	68,527
1900.....	96,730
1901.....	77,819

From these figures it would appear that the average value per animal has in recent years been about \$1.50, considerably lower than the earlier figures for 1857 and 1871, which ranged between \$3 and \$4 per animal.

Bringing together the various estimated catches for the different sealing districts, the following would seem to be an approximate total estimate for the period at or about 1880:

Newfoundland and vicinity.....	500,000
Jan Mayen	200,000
Caspian Sea	130,000
Nova Zembla and White Sea	70,000
Greenland	89,000
Total	989,000

In round numbers, therefore, the total annual catch must have been about 1,000,000 seals, the products of which were worth from \$1,500,000 to \$3,000,000. The industry has declined considerably in recent years, but granting that its product has fallen to two thirds or even one half, it is still a valuable one and worthy of such measures as may be necessary to preserve and perpetuate the race of animals upon which it depends. The fate of this industry in the North Atlantic Ocean would seem to be equally important with that of the fur seal industry in the North Pacific Ocean. The danger which seems to threaten in one case is much the same as in the other—indiscriminate and wasteful killing.

Fur Seals.—The fur seals or sea bears constitute two groups or genera, *Arctocyon*, (*A. townsendi*, Guadeloupe Island; *A. philippi*, Galapagos Islands; *A. australis*, southern coasts of South America and neighboring islands; *A. fosteri*, coasts of New Zealand and southwestern Australia; *A. delalandi*, islands off South Africa; *A. gasella*, Kerguelen and Prince Edward Island), once numerous and widely distributed among the pelagic islands of the southern hemisphere, but now practically extinct through indiscriminate slaughter in the greater part of its habitat, remnants of importance only existing on Lobos Island, in the mouth of the River Plata in Uruguay, and on the islands off Cape Horn, receiving in both places government protection; and *Callorhina* (or *Otaria*), *C. ursinus*, Commander Islands; *C. alascensis*, Pribilof Islands, in Bering Sea; and *C. curvicauda*, Kurile Islands and Robben Island; in the Sea of Okhotsk), limited to the waters of the North Pacific Ocean and alone of any considerable commercial importance.

The typical male fur seal or "bull" attains maturity at about the age of seven years, weights from 400 to 500 pounds, is about six feet in length and has a girth of four and one-half feet. His color is blackish or dark brown, with yellowish-white water hairs, especially long on the back of the neck, forming the so-called "wig" or mane. The forelimbs or flippers, with broad membrane connecting and extending beyond the toes, are used in swimming. The animal stands erect and runs or lopes along the ground when on land. The adult female or "cow" is smaller, averaging about 80 pounds in weight, with length and girth in proportion. Her fur is of varying shades of brown. She bears her first young or "pup" at the age of three years. The breeding grounds are boulder-strewn beaches or rocky hill slopes near the shore, and on these the gregarious instinct of the animals leads them to congregate in closely set masses called "rookeries." The fur seals are polygamous, each adult bull getting about him as many cows as he can control; these family groups forming the unit of rookery life are called "harems," and range in size from 1 to 100, depending upon advantage of location, the average size being about 30. The bulls reach the islands early in May and select their places, awaiting the arrival of the cows which begins early in June. The incoming is gradual, the number on the rookeries growing steadily to a climax at about the middle of July, when the greatest number (not, however, more than one half at any one time) are present, the number diminishing to one fourth at and after the close of the breeding season about the 1st of August. The single pup, weighing 10 to 12 pounds and black in color, soon changing to gray, is born within 6 to 48 hours after the arrival of the mother. Within a week she is served by the bull and goes away to sea to feed, returning at gradually lengthening intervals to nourish her young, which remains on shore. The young males of one, two, three, and four years, called "bachelors," herd by themselves on beaches adjacent to but distinct from the breeding grounds, the fact upon which depends the principle of land killing by which only the superfluous males are taken. The bulls having fasted since their arrival in May go away



A HERD OF FUR SEALS, GORBATCH ROOKERY, PRIBILOF ISLAND, ALASKA.

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early in August to feed. The pups learn to swim at the age of six weeks and in November, on the approach of winter, swim away with their mothers to the south. The winter migration of the Pribilof Islands herd extends to the latitude of Southern California, which is reached by a more or less direct route through the ocean, late in December. The return journey is made more slowly and follows the outline of the coast. The Commander Island seals make a similar journey to the southern extremity of Japan and return on their course. The seals of Robben Island have their migration route in the inland sea of Japan. The fur seals find their food, chiefly squid (*Gonatus amarus*) and a small smelt-like fish (*Therobromus callorhini*), in deep water, and their feeding grounds in Bering Sea and on the spring migration lie in a general way along the 100-fathom curve.

We owe our first knowledge of the fur seals of the North Pacific to Georg Wilhelm Steller, the naturalist of Vitus Bering's second voyage, in 1841. On the return trip Bering's ship was wrecked on one of the two islands now known in his honor as the Commander Islands. The survivors of the wreck wintered on Bering Island where the great commander died. Steller succeeded to the command of the expedition and during the winter made a study of the fur seals or sea bears, among other animals which he found on the island, the great rookeries of Bering Island furnishing him with a wealth of material.

The Commander Islands lie in Bering Sea in lat. 55° N. and lon. 166° E., 97 miles to the eastward of the peninsula of Kamchatka and 180 miles to the westward of the island of Attu, the westernmost land of the Aleutian Archipelago. They are barren, mountainous stretches of land of no interest or importance aside from the fur-bearing animals found upon them. In addition to the fur seals, the blue or Arctic fox was once numerous, as was also the sea-otter, the latter now very scarce because of excessive hunting. The sea-lion and the sea-cow or Manatee were also found in numbers about these islands. The latter is now extinct. Bering Island is the larger of the two. It is about 35 miles in length by an average width of about 15 miles. Its companion, Copper Island, is very much smaller. Small villages exist on each island in which the native sealers and the officials of the government and commercial company live. The islands belong to Russia, having remained in her possession since their discovery in 1741.

The Pribilof Islands are the home of the most important of the northern fur seal herds. They lie in the eastern portion of Bering Sea, about 200 miles from Cape Newenham on the mainland of Alaska and a like distance from the Island of Unalaska, in lat. 56° N. and lon. 170° W. There are five islands in the group, of which two only, St. Paul and St. George, are important, the former having an extreme length of 13 miles and a width of about 7. St. George Island is about one half as large. Like the Commander Islands they were unknown to aboriginal man. They were discovered in 1786 by Gerassim Pribilof, a Russian navigator in the employ of the trading companies then engaged in exploiting the resources of the Commander Islands and already seeking new fields. Each island has a native village with its com-

pany store, Greek-Russian church and American school. The village of St. Paul numbers about 200 people, that of St. George half as many, natives from the Aleutian Islands brought over in the early days by the Russians to work the fur seal industry. The natives are paid for their labor at so much per skin, the present price being 50 cents. The sum thus earned is treated as a community fund and is divided among the heads of families on the basis of age and skill. When the annual quota numbered 100,000 skins the natives were rich. At the present time the quota is about one fifth this amount and the earnings of the sealers are supplemented by a Congressional appropriation. The affairs of the islands are administered directly by officers of the Treasury Department resident on them. The Pribilof Islands were joined with the Commander Islands and remained under the control of Russia until 1867, when they passed, with the territory of Alaska, into the possession of the United States.

After many experiments, some of them disastrous, the Russians worked out a system of management of the fur seal industry which, with slight modifications, is still in vogue on the islands. The important feature of this system is the absolute protection of the female herd. The land sealing is confined to the young males of two and three years of age, 29 out of every 30 of which are superfluous for breeding purpose, owing to the polygamous habit of the animals. These young males, as they rest on their hauling grounds, are surrounded at night by the sealers, rounded up and driven slowly inland in great droves of from one to three thousand. On the killing grounds the large droves are gradually broken up into small groups or pods of from 20 to 50. From these men armed with stout clubs knock down those of killable size, leaving those too large or too small to escape and return to the water. The skins are removed by other workers. A crew of 20 to 30 men will thus kill and skin 1,500 to 2,000 seals in half a day. The different hauling grounds are driven in succession during the killing season, which lasts from the 1st of June until about the 1st of August, after which time the skins begin to get stagey, owing to the shedding of the water hair. The skins are gathered up and salted in kenches. After remaining in the salt for 10 days or two weeks they are taken out and wrapped in bundles, two in each, and are ready for shipment. They are eventually shipped to London, where practically all the seal-skins of the world are prepared for use. The two important processes in the treatment of the raw skin are the removal of the coarse water hairs, which have to be carefully plucked out, and the dyeing of the fine under fur. Both require the greatest skill, and when the skin has been thus dressed and dyed its value has been doubled.

When the United States came into possession of the Pribilof Islands in 1868, following the example of Russia, she leased the fur seal industry to the Alaska Commercial Company, which controlled the industry for a period of 20 years. The company paid a rental of \$55,000 a year for the islands and a royalty of \$3 on each skin taken. During the period of its lease the company took an average annual quota of 100,000 skins. The government also derived revenue from import duties on dressed seal-skins brought over from London for consump-

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tion in this country. In all, the government received during this first period of 20 years, in rental, royalty, and import duties, nearly \$13,000,000, or about twice the total cost of the entire territory of Alaska. It is needless to say that the industry proved a source of wealth to the company controlling it. The same company leased the Commander Islands from Russia and took there a quota of about 50,000 skins a year.

In 1890 the fur seal industry of the United States passed into the hands of the North American Commercial Company which still controls it. The terms of the new lease were more advantageous to the government, the royalty on skins being fixed at \$10 each. With the first year of the new lease a marked change was manifest in the fur seal herd. The annual quota fell from 100,000 to 28,000, a figure above which it has not risen since. The cause of this decline was found in the development of a rival sealing industry, the hunting of the seals in the open sea while on their migrations and feeding excursions.

Pelagic sealing, as this hunting is now called, is the outgrowth of a custom practised by the Indians of the Northwest Coast from the earliest times. Going out from the shore in the vicinity of Cape Flattery and Vancouver Island in their canoes they captured with the spear such stragglers from the migrating herd as came within their reach. The number of animals taken in this way was small, probably not exceeding 5,000 a year, until 1879. The skins found their way to the markets through the traders and, as sealskins increased in value, this irregular source of supply became an object of attention. In 1879 vessels began to be used to convey the Indians and their canoes out to the main body of the herd, to remain with them, affording shelter at night and in time of storms, and enabling the hunters to move with the progress of the herd. From a single vessel in 1879 the pelagic industry expanded enormously until in 1891 the sealing fleet numbered 122 vessels, each with from 5 to 20 sealing crews, and in 1894 it made a total catch of 143,000 seals. When the sealing vessel comes into sight of seals its boats are lowered and the hunters put off to windward in diverging directions. The spearsman stands in the bow and the steersman manages the boat. The seals are usually found sleeping on the surface of the water. The boat approaches noiselessly and the spear is thrown by means of a long detachable shaft. The spear head is attached to the boat by a line, and when the captured animal is tired out it is drawn up to the boat and killed with a short club. If the shotgun is used the animal is similarly approached and, after being shot, the body is quickly recovered with a gaff to prevent its sinking. The operations of the sealing fleet were gradually extended from the vicinity of the Straits of Fuca until they covered the entire migration route of the Pribilof herd, from the Santa Barbara Channel to the passes of the Aleutian chain. Finally it entered Bering Sea and attacked the herd on its summer feeding ground. In a similar way the pelagic fleet covered the migration route of the Commander herd.

Pelagic sealing must, in the nature of things, be indiscriminate, as the sex of the animal

cannot be distinguished in the water and the hunter aims to kill every animal found. The killing of the males on land naturally leaves the herd as found at sea composed chiefly of females. The killing of the female seal on the spring migration involves the death of her unborn offspring. When killed in Bering Sea in August and September her dependent young is left to starve on the rookeries. Investigations of the pelagic catch in 1895 and 1896 showed the percentage of females in the pelagic catch for these years to be 63 and 84 per cent respectively. In the latter season 20,000 starved pups were counted upon the rookeries of Saint Paul and Saint George, their mothers having been killed at sea.

Aware of the disastrous effects of pelagic sealing, and acting under shadow of a claim made by Russia in 1820 to absolute jurisdiction over Bering Sea in the interests of her fur seal herd, a claim since found untenable, the United States in 1886 began seizing sealing vessels operating in Bering Sea, among them Canadian vessels. This brought on a diplomatic discussion with Great Britain which dragged along until 1892, when the two nations agreed upon a treaty submitting to a court of arbitration the question of jurisdiction in Bering Sea, and of what regulations, if any, were necessary for the protection and preservation of the fur seal herd when beyond the ordinary territorial limit of three miles. This tribunal of arbitration met in Paris in the spring of 1893 and rendered its decision in August of the same year. The decision on the legal questions involved was adverse to the contention of the United States, and as provided in this event, a set of regulations was formulated for the protection of the herd, to be enforced jointly by the two nations. These regulations provided, after the analogy of game laws, for a closed season in May, June, and July, when all sealing should be suspended, and for a closed zone of 60-miles radius about the islands, within which no sealing whatever should be allowed. The closed season covered the breeding period, the protected zone was supposed to provide a safe feeding ground for the mother seal while her young was dependent upon her. The regulations, however, failed of their object because the mother seal does not feed within the protected area, but far outside of it. She was, therefore, taken by the pelagic sealer as before, and her young was left to starve. The largest catch in the history of pelagic sealing, that of 1894, was made in the first season of the operation of the very regulations designed to so limit and restrict pelagic sealing as to protect and preserve the herd.

In 1896, because of the continued decline of the fur seal herd, it was agreed between the United States and Great Britain to re-open the question with a view to a possible revision of the regulations, and each nation sent a scientific commission into Bering Sea to inquire into all facts relating to seal life. The commission for the United States was under the direction of President David Starr Jordan of Stanford University, California, that for Great Britain, under the direction of Professor D'Arcy Wentworth Thompson of University College, Dundee, Scotland. At the close of the investigations which covered the seasons of 1896 and 1897, the two

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commissions met at Washington in a joint conference known as the Conference of Fur Seal Experts, and after a full discussion of the results of their labors, reached an agreement on all essential facts, establishing the fact of decline, its probable rate and its cause. The cause was fixed as the killing of females at sea involved in pelagic sealing and the agreement foreshadowed—the commissions having no power to consider ways and means—the abolition of pelagic sealing as the only means of saving the herd. On the basis of this agreement the fur seal question passed into the hands of the Joint High Commission called at Quebec in 1898 to consider this among a number of other questions in dispute between the United States and Canada. Unable to reach an agreement on the boundary dispute this Joint Commission suspended action without result, and its labors have never been resumed. Meanwhile pelagic sealing has continued and the herd has steadily declined.

It is probable that in the days of its prosperity—1870 to 1885—the fur seal herd of the Pribilof Islands numbered 2,500,000 animals of all classes, the herd of the Commander Islands, half as many more. The maximum product of the herd for this period was 100,000 skins on the Pribilof Islands and 50,000 on the Commander Islands, valued at from \$15 to \$25 in the raw state, at from \$30 to \$40 when dressed and dyed. The product of the Pribilof Island land sealing for 1902 was 22,304 and of the Commander

Islands sealing 7,733. A like decline is found in the results of the pelagic industry, which is necessarily suicidal in its nature. Its total catch—and the greatest in its history—for 1894 was 143,000; its total catch for the season of 1902 was 16,058. No stronger arraignment of pelagic sealing can be made than that which a comparison of these figures gives. It is to be hoped that an agreement will soon be reached by which this destructive agency may be done away and this wonderful race of animals and the valuable legitimate industry which depends upon it may be saved to the world. The United States and Great Britain, by acceptance of the Paris Award, and by enforcement of its regulations for the restriction of pelagic sealing since 1894, have established a precedent which should make it an easy step to the abolition of such sealing.

In the subjoined table, compiled from various sources, is brought together the total statistics of the fur seal industry, and these figures give a comprehensive view of the whole subject.

Summary:

From all sources prior to 1868.....	3,197,154
From Pribilof Islands (land sealing)....	2,542,520
From Commander Islands (land sealing)....	996,255
From Pribilof herd (pelagic sealing)....	776,429
From Commander herd (pelagic sealing)....	322,955
From Lobos Island.....	390,400
From Cape Horn.....	165,569

Grand total 8,391,282

References: Allen, 'North American Pinnipeds' (1880); Rink, 'Danish Greenland'

FUR SEALSKINS FROM ALL SOURCES, 1743 TO 1902.

YEAR	Land sealing		Pelagic sealing		Southern sealing	
	Pribilof Ida.	Commander Ida.	Pribilof Ida.	Commander Ida.	Lobos Ida.	Cape Horn
1743 to 1820	2,167,040					
1821 to 1842	Exported from Russian Colonies	458,502				
1843 to 1867	571,612					
1868	240,000	.....	4,367	.....	.....	.....
1869	87,000	.....	4,430	.....	.....	.....
1870	23,773	.....	8,686	.....	.....	.....
1871	102,960	3,658	16,911	.....	.....	.....
1872	108,819	29,356	5,336	.....	.....	.....
1873	109,177	30,399	5,229	.....	3,956	.....
1874	110,585	31,300	5,873	.....	8,509	.....
1875	106,460	36,279	5,033	.....	8,179	.....
1876	94,657	26,960	5,515	.....	11,353	6,366
1877	84,310	21,533	5,210	.....	13,066	7,631
1878	109,323	31,340	5,544	.....	12,301	8,227
1879	110,411	42,740	8,557	310	12,295	12,180
1880	105,718	48,504	8,718	1,192	14,836	17,562
1881	105,063	43,522	10,382	.....	13,569	13,164
1882	99,812	44,020	15,551	.....	13,200	11,711
1883	79,509	28,699	16,557	28	12,861	4,655
1884	105,434	53,263	16,971	212	16,258	6,743
1885	105,024	43,575	23,040	1,920	10,953	3,404
1886	104,521	54,591	28,494	11,000	13,667	909
1887	105,760	46,347	30,628	16,000	11,068	2,762
1888	103,304	47,362	26,189	726	20,747	4,403
1889	102,617	52,859	29,858	13,300	8,755	3,021
1890	28,059	53,780	40,814	11,000	18,541	2,450
1891	12,040	36,905	59,568	8,432	15,834	3,114
1892	7,511	31,244	46,642	26,752	12,202	6,292
1893	7,396	32,818	30,812	66,143	13,624	2,131
1894	16,270	27,287	61,838	79,305	12,145	62
1895	14,846	17,719	56,291	37,935	12,017	1,888
1896	28,964	14,741	43,917	24,191	14,019	2,510
1897	20,890	13,726	24,321	13,801	12,791	1,265
1898	18,047	8,942	28,242	410	14,422	4,204
1899	16,812	9,748	34,647	.....	14,918	6,908
1900	22,470	13,237	32,096	.....	15,116	8,765
1901	22,674	11,468	18,875	5,527	12,831	11,329
1902	22,304	7,733	11,287	4,771	16,367	11,973

SEALSFIELD — SEAMAN

(1877); Carroll, 'Seal and Herring Fisheries of Newfoundland' (1873); Schultz, 'Fisheries and Seal-hunting in White Sea, Arctic, and Caspian Sea,' translated in Report of United States Commission of Fish and Fisheries, Part III. (1873-4); Southwell, 'Notes on Seal and Whale Fishery,' Zoologist (London 1883-1902); Elliott, 'Fur Seal Islands of Alaska' (1882); 'Proceedings of Tribunal of Arbitration,' 15 vols. (1895); Jordan and others, 'The Fur Seals and Fur Seal Islands of the North Pacific' (1898).

GEORGE ARCHIBALD CLARK,

*Secretary of the Fur Seal Commission 1896-7,
Leland Stanford, Jr., University.*

Sealsfield, sêlz'fêld, Charles, pseudonym of KARL ANTON POSTEL, Austrian novelist: b. Poppitz, Moravia, 3 March 1793; d. Soleure, Switzerland, 26 May 1864. He entered a monastery and was ordained in the priesthood, but in 1822 he fled to Switzerland and thence to the United States; where he lived in 1822-6 and 1827-30. In 1829 he edited in New York the 'Courier des Etats Unis,' and after 1832 made his residence chiefly in Switzerland, though he visited the United States at intervals. He subsequently engaged in novel writing, his work creating a sensation in Germany. His publications include: 'Die Vereinigten Staaten von Nordamerika' (1828); 'Der Legitime und die Republikaner' (1833); 'Lebensbilder aus beiden Hemisphären' (1835-7); 'Das Kajütenbuch' (1840); 'Süden und Norden' (1842-3); etc.

Seaman, sê'man, Owen, English writer: b. 18 Sept. 1861. He was educated at Clare College, Cambridge, in 1888 became lecturer in literature at the Durham College of Science (Newcastle-on-Tyne), and in 1890 was there appointed to the newly established professorship of literature. In 1897 he was admitted barrister of the Inner Temple. He began contributions in 1894 to the 'National Observer,' in 1895 to the 'World,' and in 1894 to 'Punch,' whose staff he joined in 1897, and of which he became editor in 1906. Among his books of verse are: 'With Double Pipe' (1888); 'Horace at Cambridge' (1894); 'Tillers of the Sand' (1895); 'The Battle of the Bays' (1896); 'In Cap and Bells' (1899); 'Borrowed Plumes' (1902); 'A Harvest of Chaff' (1904).

Seaman, a person below the rank of officer who is employed in the navigation of a vessel either coastwise or on the high seas. The word "sailor" is broader in meaning than that of seaman, including men employed on inland waters as well as at sea, and in the United States, with a vast area of navigable lakes, sailor is the term more generally used. Seaman-ship is, of course, as old as navigation, and that originated before the historic period. Although in ancient times vessels were propelled to a great extent by the labor of slaves, chained to the oars they handled, the men engaged in navigating ships were usually free, and the ancient seamen appear to have had more voice in matters affecting the voyage than seamen have to-day. Commerce by water was the chief source of the wealth which made Tyre and Carthage, and some of the Greek cities in Asia and Europe rich and powerful, and skilful seamen were, therefore, in great demand. Similar conditions prevailed in the more prosperous republics of

the Middle Ages, and the Northmen who spread their sails in search of lands they could plunder and subdue were sailors and warriors both.

The discovery of America gave a great impulse to seamanship, and may be said to have created a new race of sailors, who were also adventurers, and whose feats of navigation have never been surpassed for daring, skill, and achievement. In the early days of the American colonies, and indeed up to the time when manufactures attracted the surplus population of the rural districts, Americans might almost have been called a race of sailors. They sailed around the world in their merchant ships, fighting French privateers, and, when nearer home, dodging English revenue cutters, and in this school of varied hardship and adventure they learned the lessons of seamanship as no others had learned it before. Good sailing ability to navigate a ship to the best advantage, was almost as requisite as good gunnery in the naval battles of a century ago, and America's splendid naval record of 1800 to 1815, in combat with French, Barbary pirates, and British, proves that American seamen could both navigate and fight.

The seamen in American vessels to-day are mostly of foreign origin. Scandinavia supplies a large proportion of them, and they are excellent sailors. Strict laws are on the statute books regulating the engagement and treatment of seamen, their claims to pay, and their discharge and return to this country, if abroad. Seamen can no longer be beaten and cuffed with impunity by brutal shipmasters. The authorities, both civil and criminal, are quick to uphold the cause of a seaman who has a real grievance. Merchant seamen make their contract by signing a written agreement called the shipping articles. This must set forth the voyage, the ports at each end, and all other matters which are necessary to an intelligent understanding of the contract. The contract, when signed, is not absolute evidence of agreement on the part of the seaman, who may prove, if he can, that he was induced to sign by fraudulent representations, or while irresponsible. The law provides penalties for violation of the contract by either party; the amount and quality of provisions while on a voyage are regulated by statute, and the master is bound to pay the wages due, unless he can show that the seaman has been insubordinate or inefficient. A seaman refusing, without good cause, such as illness or other disability, to do the work assigned to him, may be put in irons while on board, and prosecuted in the nearest United States court. If he deserts he may be arrested, and punished by forfeiture of wages and imprisonment. He can justify desertion by proof of cruel treatment. If a seaman is discharged without cause and against his will in a foreign port, the master can be punished by six months' imprisonment, or a fine of \$500. If the seaman, who has done his duty, is willing to be discharged abroad, and the master on his part is willing to let the man go, the master must pay him three months' wages beyond what is due, one third of which amount goes to a fund for the maintenance of American seamen abroad and for bringing them home. It is part of the duty of American consuls to be vigilant in the protection of American seamen, and the master

SEARCH-LIGHT—SEARING

of a vessel must present his papers for examination by the American consul or consular agent in all ports visited, and must explain the reasons for the absence of anyone entered in the list of the crew.

Unfortunately many seamen are ignorant of the provisions of law intended to guard them from abuse and imposition, and the dissipation in which many of them indulge when on shore helps to make them easy victims of unscrupulous boarding-house keepers and shipmasters, who conspire to rob them of advance money, and virtually kidnap them on board vessels on which they had no intention of sailing. This evil is undoubtedly winked at, in some instances, by corrupt officials, who presumably receive a share of the proceeds. Some outrage, greater than usual, calls attention at intervals to the wrongs being perpetrated on seamen, and then there is a brief spasm of public anger, and talk of prosecution and reform. This dies out, as a rule, without serious action having been taken, and matters go on as before. The lot of the American seaman is, however, immeasurably better than it was in the early part of the 19th century, for now the law is on his side, when invoked, whereas formerly all its power was exerted on the side of the shipmaster, however cruel and unscrupulous.

In England also the seaman has had ample legal protection for over half a century, since the passage of the mercantile marine act of 1850, which lays down minute rules for the government of both masters and seamen. The provisions of the act are very similar to the American laws bearing on the same subject.

Search-light. See ELECTRIC LIGHT; LIGHT-HOUSE.

Search, Right of, so far as it applies to the homes, persons, papers, and effects of American citizens, is regulated by the Fourth Amendment to the Constitution of the United States, which provides that the right of the people to be secure against unreasonable searches and seizures shall not be violated. This provision appears also in State constitutions. A magistrate should issue a search warrant only on evidence sufficient for a reasonable presumption that stolen articles, or articles used in violation of law, such as gambling implements, are to be obtained by the search, or that evidence essential to a prosecution for serious crime may thus be secured. An officer holding a warrant for the arrest of a person charged with crime may enter upon any premises where he believes that person to be, but is responsible both civilly and criminally for abuse of his authority. If an officer makes an arrest without lawful authority he is liable for false imprisonment. Persons not charged with crime may be arrested and detained as witnesses.

The extent of the right of search by belligerents of the vessels of neutrals is a much disputed question, and although it has been agitated for over a century it is far from a comprehensive and satisfactory decision. The assertion by Great Britain, during the wars with Napoleon, of the right to search American vessels on the high seas for alleged deserters from the British navy—some of whom were hanged after being taken from an American man-of-war—provoked the War of 1812. When peace

was made, although other points in dispute were adjusted, this question was left unsettled. England, however, making no further attempt to interfere with American vessels, and the fall of Napoleon removing the causes which had led to England's high-handed measures.

The Declaration of Paris, signed by the plenipotentiaries of France, Russia, Great Britain, Austria, Prussia, Turkey, and Sardinia, 16 April 1856, sought to settle the various questions relating to the right of search, declared privateering abolished; that the neutral flag covered enemy's goods, except contraband of war, that neutral goods, except contraband of war, were not liable to seizure, even under the enemy's flag, and that blockades, to be binding, must be effective. The United States did not assent to this declaration, and matters were in this condition when the American Civil War broke out.

In 1861 a collision between the United States and Great Britain was nearly caused by the unauthorized action of the commander of a Union war-vessel, who stopped the British mail steamer Trent on the high seas, and took from the Trent as prisoners Messrs. Slidell and Mason, commissioners of the Confederate States proceeding to Europe. England made preparations for war, but the government at Washington disavowed the stoppage of the Trent, and released the commissioners. No privateers were chartered by the United States either during the Civil War or the Spanish-American War. In the latter conflict the United States and Spain proclaimed their intention to adhere to the principles of the Declaration of Paris, and this determination was adhered to throughout the war.

The right to search a neutral vessel for contraband of war is universally admitted, this right, however, being confined to private merchant vessels, and not applying to ships of war. The exercise of this right must be conducted with due care and regard to the rights and safety of vessels. All civilized powers also exercise the right of stopping and searching, and, if cause be found, seizing or destroying, should resistance be shown, a vessel suspected of piracy or slave-trading. See BLOCKADE; CONTRABAND OF WAR; PARIS, DECLARATION OF.

Search Warrant is a warrant requiring the officer to whom it is addressed to search a house or other place therein specified, for property therein alleged to have been stolen; and if the same shall be found upon such search, to bring the goods so found, together with the person occupying the same, who is named, before the justice or other officer granting the warrant, or some other justice of the peace, or other lawfully authorized officer. It should be given under the hand and seal of the justice and dated. The Constitution of the United States declares that "the right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the person or things to be seized."

Sear'ing, Laura Catherine Redden ("HOWARD GLYNBEN"), American author: b. Somerset, Md., 9 Feb. 1840. At ten she lost the power of hearing and of speech through illness, and was

educated at the Missouri Institute for Deaf Mutes. Later she largely regained the faculty of speech at Clark Institution, Northampton, Mass. She was married to Edward W. Searing in 1876. Her literary career began when she was 18, and during the Civil War she was a newspaper correspondent at Washington. In 1866-7 she was in Italy as correspondent for the *New York Times* and also engaged in literary work for the department of agriculture. During the Franco-Prussian war she wrote 'German War Gossip' for the *New York Tribune*, was on the staff of the *New York Mail* in 1868-76, and in 1886 removed to California, where she has continued writing for the leading periodicals. She has published 'Notable Men in the House of Representatives' (1864); 'Idyls of Battle' (1864); 'Sounds from Secret Chambers' (1874); etc.

Sears, sērz, Isaac, American patriot: b. Norwalk, Conn., 1729; d. Canton, China, 28 Oct. 1786. He descended from Richard Sears, who emigrated from Colchester, England, in 1630, and settled in Massachusetts. He was in command of a privateer against the French in 1758-61, and after losing his vessel, located in New York, and engaged in the West Indian and European trade. He became a prominent member of the "Sons of Liberty," and was chairman of the first committee of correspondence established in New York. He commanded the troop that raided the printing establishment of James Rivington, editor of the 'Royal Gazette.' After destroying the presses, the types were carried away to be cast into bullets. He was a member of the provincial congress in 1783, and also of the State assembly of New York. Having lost his fortune, he shipped as super-cargo on a merchant vessel and contracted a fever on the voyage to China, from which he died.

Sears, Joseph Hamblen, American author: b. Boston 1865. He was graduated from Harvard in 1889, and has since published 'The Governments of the World To-day' (1893); 'Fur and Feather Tales' (1897); 'None But the Brave' (1902).

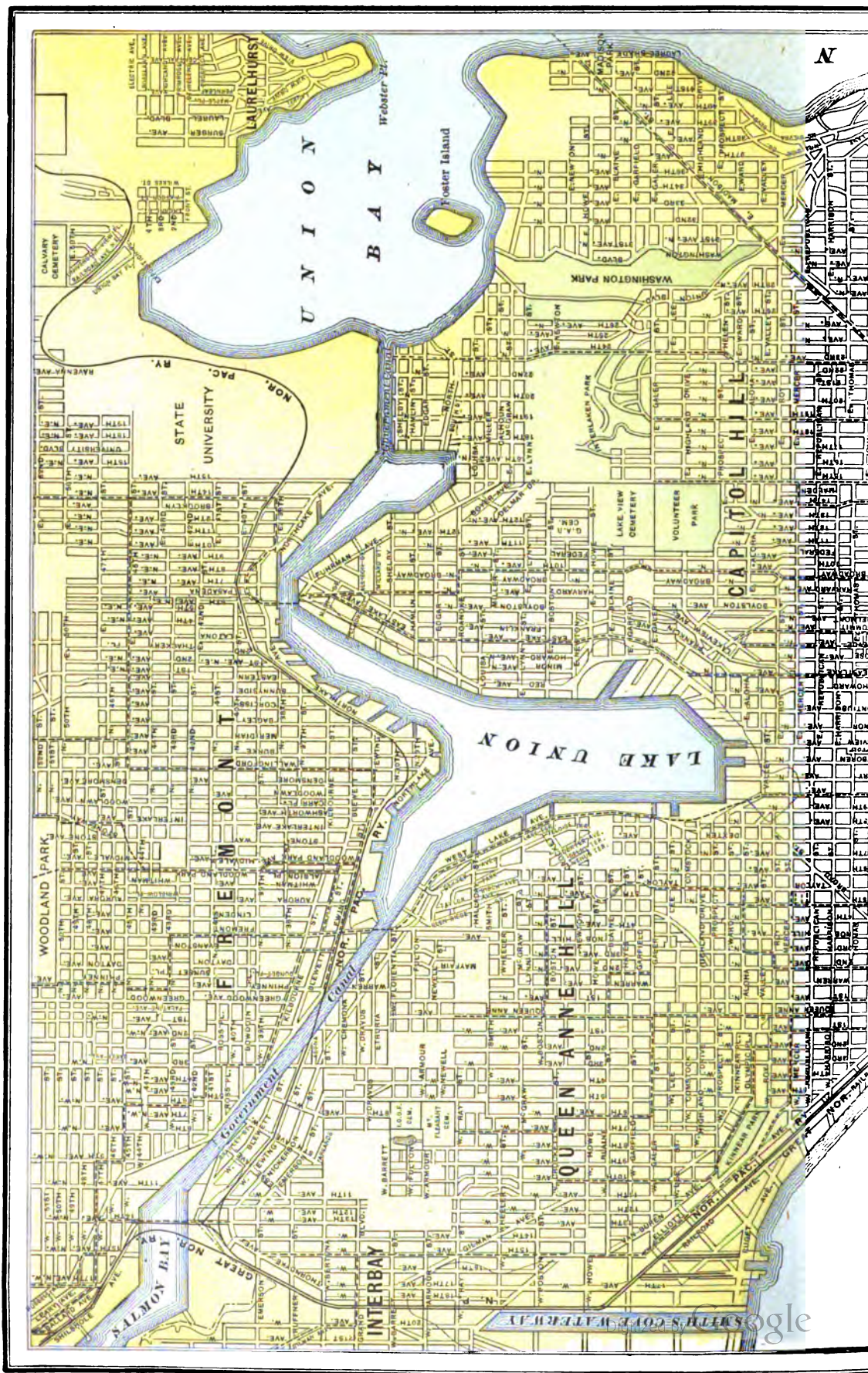
Sears, Lorenzo, American rhetorician: b. Searsville, Mass., 18 April 1830. He was graduated from Yale in 1861, from the General Theological Seminary, New York, in 1864, and was engaged in pastoral duties in New England in 1864-85. He was appointed to the chair of rhetoric and English literature at the University of Vermont in 1885, which he filled until 1890, since when he has occupied that of rhetoric and American literature at Brown University. He has published: 'History of Oratory' (1897); 'Principles and Methods of Literary Criticism' (1898); 'A Historical Introduction to the Library of Modern Eloquence' (1901).

Sears'port, Maine, town on Penobscot Bay; five miles northeast of Belfast and about 30 miles southwest of Bangor. Its chief industries are ship-building, ice-gathering, shipping hay and lumber, and poultry products. It has lumber and grist mills, and a spool mill. It has a high school, graded elementary schools, and the Sears Public Library, opened in 1872. The national bank has a capital of \$50,000; the savings bank has a large amount of deposits. Pop. (1910) 1,444.

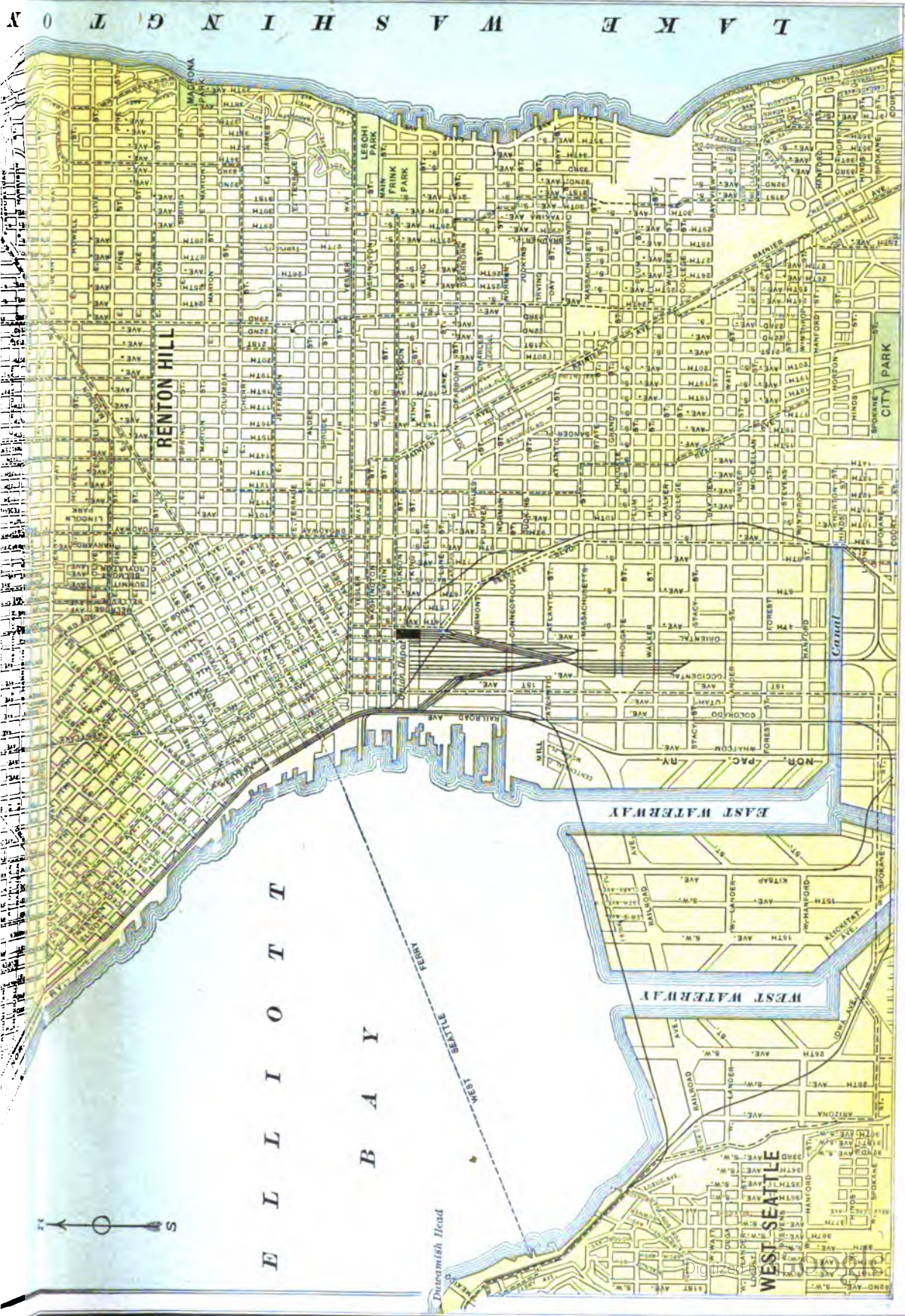
Seasickness, an affection attended with nausea and other disagreeable sensations produced by the motion of a vessel. Its causes and etiology are as yet imperfectly understood. Some refer it to causes dependent upon the altered or affected functions of the nervous centres; others to the regurgitation of bile into the stomach; and still others to irritation of the liver by the unusual movements of the body, increased secretion of bile being secondary. Probably each of these views contains something of the real explanation of the disorder.

When a landsman goes to sea, the movements of the ship, and the shifting lines and surfaces, unsettle his visual stability, as the different inclinations of the plank he stands on unsettle his muscular sense. The consequent derangement of these faculties reacts upon the nervous centres, and through the latter upon the viscera, thus producing nausea and vomiting. Recollection of the disturbing sensations, together with the emotional state which they originally excited, may itself become an efficient cause, at least in individuals, of peculiarly irritable stomachs, or of highly sensitive nervous systems; for this plays downward upon the sensorial centres in such a manner as to excite in them the same condition as that which was originally produced through the medium of the sensory nerve. This may explain why certain individuals show all the symptoms of seasickness on going aboard a vessel perfectly at rest. So, no doubt, imagination is a potent and important factor in the case. The fact that visual impressions predispose travelers to seasickness suggests that a susceptible individual, when on deck, should shut the eyes.

But perhaps the chief causes of seasickness may be summed up thus: (1) Effusion of blood to the brain; (2) disturbance of the digestive system; (3) over-eating, and also under-eating. Many preventive measures referring to the construction and arrangement of vessels have been tried with little success; yet experiments with vessels having a swinging saloon, designed to preserve equilibrium in any sea, and vessels with a breadth intended to minimize the rocking motion, show that nautical men and shipbuilders are becoming alive to the interests and comfort of travelers. Preventive measures regarded from the patient's point of view are practically limited to the regulation of diet before a voyage. The diet for some days previously should be plentiful, but of light and nutritious character. Above all, the bowels should not be constipated, and food should not be taken for at least five or six hours before going on board, although a cup of strong coffee just before embarking will prove beneficial as a slight stimulant. On the ship a position as near the centre as practicable is to be preferred. It is best when lying down to lie on the back, with the head and shoulders very slightly elevated. As a curative measure during the attack of nausea and vomiting, brandy and ice in small doses may be given. Champagne is better in the period of depression and exhaustion during a long sickness than at the beginning. A bandage moderately tight, across the pit of the stomach, or an ice-belt or even cold compresses all along the spine may afford relief; while some are benefited by sipping frequent drafts of lukewarm or cold water, though a glass of hot milk may



L A K E W A S H I N G T O N



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SEATTLE

E L L I O T T

B A Y

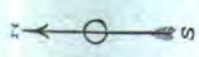
Ducumish Head

SEATTLE FERRY

EAST WATERWAY

WEST WATERWAY

WEST SEATTLE



SEASONS — SEATTLE

be better. The presence of any harmless fluid in the stomach tends at least to prevent the disagreeable sensations of retching. Three or four drops of chloroform on lump-sugar may prevent vomiting, and a suitable dose of bromide of soda and antipyrine will often give further relief. Some physicians recommend cocaine tablets, $\frac{1}{4}$ grain, with intervals of an hour. Many medical men consider that if drugs must be taken, the best all-around remedy is chlorobrom (not chloroform), a compound of chloralamide and bromide of potassium, while some prefer five grains of bromide of ammonia.

Seasons. the four grand divisions of the year. Spring is from the vernal equinox, when the sun enters Aries, to the summer solstice; summer is from the summer solstice to the autumnal equinox; autumn is from the autumnal equinox to the winter solstice; winter is from the winter solstice to the vernal equinox. The earth's axis is inclined to the plane of the ecliptic at $66\frac{1}{2}^{\circ}$, and as the earth moves round the sun in the course of a year, the northern hemisphere is turned to the sun in summer (most so at the summer solstice); at the equinoxes the line of light and shade on the earth passes through the poles, and at the winter solstice the northern hemisphere is turned from the sun. It is evident that the characters of the seasons are reversed to inhabitants of the southern hemisphere. See AUTUMN; EARTH; SUMMER; SPRING; WINTER; etc.

Seattle, chief city in the State of Washington, county seat of King County, is situated in latitude $47^{\circ} 35'$ North, and longitude $122^{\circ} 20'$ West. The city covers a long stretch of rolling territory lying between Puget Sound and Lake Washington, being deeply indented on the west by Elliott Bay, an arm of Puget Sound, which gives the city something the shape of an hour glass. This bay constitutes a harbor of remarkable safety of some four miles in length and two miles in width. The city lies 120 miles inland from the Pacific Ocean and 804 miles by water from San Francisco. It is the terminal of the trans-continental railway systems of the Pacific Northwest. Steamship lines connect it with all large ports of the world, serving with a special frequency the Asiatic ports, Pacific islands, British Columbia, and Alaska. The waters of Puget Sound connect with the Pacific Ocean through the Straits of Juan de Fuca.

Lake Washington, which constitutes the eastern boundary of the city, is a fresh water body some 22 miles in length and varying from 2 to 4 miles in width. A large part of the western shore of this lake belongs to the Park Department of the city, and is being developed and beautified as a great pleasure ground.

Lake Union, lying in the center of the city, is a fresh water lake something the shape of the letter 'Y'. It is about a mile in length and a third of a mile in width. The United States Government will, by 1915, have completed a canal extending from the mouth of Salmon Bay into and through Lake Union and into Lake Washington. By means of a lock at the mouth of Salmon Bay, the waters of Salmon Bay, Lake Union and Lake Washington will be maintained at a uniform level of 8 feet above mean high tide.

In the northern part of the city Green Lake, almost circular in form, covering about 400

acres and lying at an elevation of about 160 feet above mean high tide, is included within the limits of Woodland Park. The highest points in city are about 500 feet above sea level, but the average elevation of the crests of the ridges which lead north and south between Lake Washington and the Sound is about 300 feet.

Climate.—The climate of Puget Sound is very similar to that of Southern England, being moist and equable, summer gently dying into winter, and winter blossoming into summer. Summer is usually designated as the dry season and winter as the rainy season. The mildness of the climate is attributed to the influence of the Japan current, the variations in seasonal conditions being attributable to the variations in the movements of that current. Owing to the mildness of the temperature, labor can be performed in the open air on practically every working day of the year. Malaria is unknown on Puget Sound, and Seattle boasts of the lowest death record of any city of its size in the world, having maintained a death rate not in excess of 9.25 per thousand for many years.

Buildings.—Buildings of the city are all modern. In the business part they are of a very handsome and substantial character. The city presents a remarkably beautiful appearance when approached from Puget Sound, from which some of its great buildings, such as the Cathedral of St. James with its two stately towers, stand out with remarkable prominence. The Public Library, the Federal Building, the King Street Stations of the Northern Pacific and Great Northern Railways and of the Oregon-Washington Railroad & Navigation Company, the Chicago, Milwaukee & Puget Sound Railway, are all structures of classic architecture. The First Presbyterian Church is regarded as one of the most notable buildings of the Northwest. The buildings of the University of the State of Washington, located in the northern part of the city, constitute a group well recognized as the pride of the state.

Parks.—Unusual pains have been taken to acquire some of the most sightly tracts of land for park development. Woodland Park, Volunteer Park and Jefferson Park are each worthy of special notice. In 1892 a complete system of parks covering a number of thousands of acres, to be connected with park drives and boulevards, was laid out by E. O. Schwagrel, and during years past the city has been engaged in the acquisition of the lands so laid out, and their careful development and beautification has been carried on under the advice of Olmsted Brothers of Boston.

Up to 1 Jan. 1912, there had been expended upon the park system four and one-half million dollars the annual expenditure of maintenance and development being about \$300,000. Fifteen miles of magnificent boulevards had been completed in connection with the parking system, and ten miles additional partly completed.

Education.—The schools of the city are in charge of a non-political school board. On 1 Jan. 1912, there were in use 6 high school buildings and 61 grammar school buildings, manned by 979 teachers and with an enrollment of 32,445 scholars. The value of the property and buildings under the control of the school board at that time is estimated at

SEATTLE

\$5,455,768. The buildings of the University of Washington occupy a most sightly campus of 353 acres, upon which the city expends \$15,000 per year maintenance as though it were a public park.

Libraries.—Seattle has for many years maintained a most excellent public library system. The central library building is a magnificent cut-stone structure which, with its grounds, is estimated at being worth more than a million and a half dollars, the shelves of which contain over 130,000 volumes of standard works. There are six branch libraries of the city, of an aggregate value of one million dollars.

Administration.—The administration of the city rests in a Mayor, City Council, and a Board of Public Works. The City Council is a strictly legislative body consisting of nine members elected at large, three members retiring each year. All executive control of the city is lodged in the Mayor and the Board of Public Works, who let all contracts and supervise all municipal functions. The city owns its own water system, owning a watershed of nearly 150 square miles of mountainous territory. The run-off from this watershed is impounded in Cedar Lake, 41 miles distant from the city, and at an elevation of 1,550 feet above sea level. A little more than 2 miles below the lake a series of cascades in the river furnish a total fall of some 630 feet. The watershed will furnish an average daily run-off of 325 millions gallons. Of this amount there is at the present time conveyed to the city 65 millions gallons per day. Reservoirs constructed on the high points of the city impound 300 millions gallons.

The city owns its own lighting system. At the foot of the cascades in the Cedar River before referred to, there has been constructed a hydro-electric power plant where there had been installed, prior to 1 Jan. 1912, machinery for generating 17,000 horse power, and where a total installation of some 50,000 horse power may be made.

There were over 20,000 commercial accounts with the municipal plant in 1911, with gross earnings of \$725,000. There are three privately owned hydro-electric power plants in operation in the vicinity of Seattle, furnishing during 1911 some 52,000 horse power of energy in addition to that furnished by the city. Some of the current generated by these private plants is used in Tacoma and some in Everett.

The city owns its sewer system, consisting on 1 Jan. 1912, of 359 miles of sewers, built at a cost of seven million dollars. There had been graded prior to 1 Jan. 1912, 590 miles of streets, 166 miles of which have been paved with permanent pavement.

At the spring election in 1911, the citizens authorized the construction of some 20 miles of municipal street railway. Existing street railways, however, are in the hands of private corporations and have a total trackage of 230 miles, and furnish a satisfactory service.

Expenditures.—The assessed valuation of the property within the city for the year 1911 was \$212,000,000, based on 46 per cent of actual value. On this a tax levy of 14 mills was made to meet current expenses.

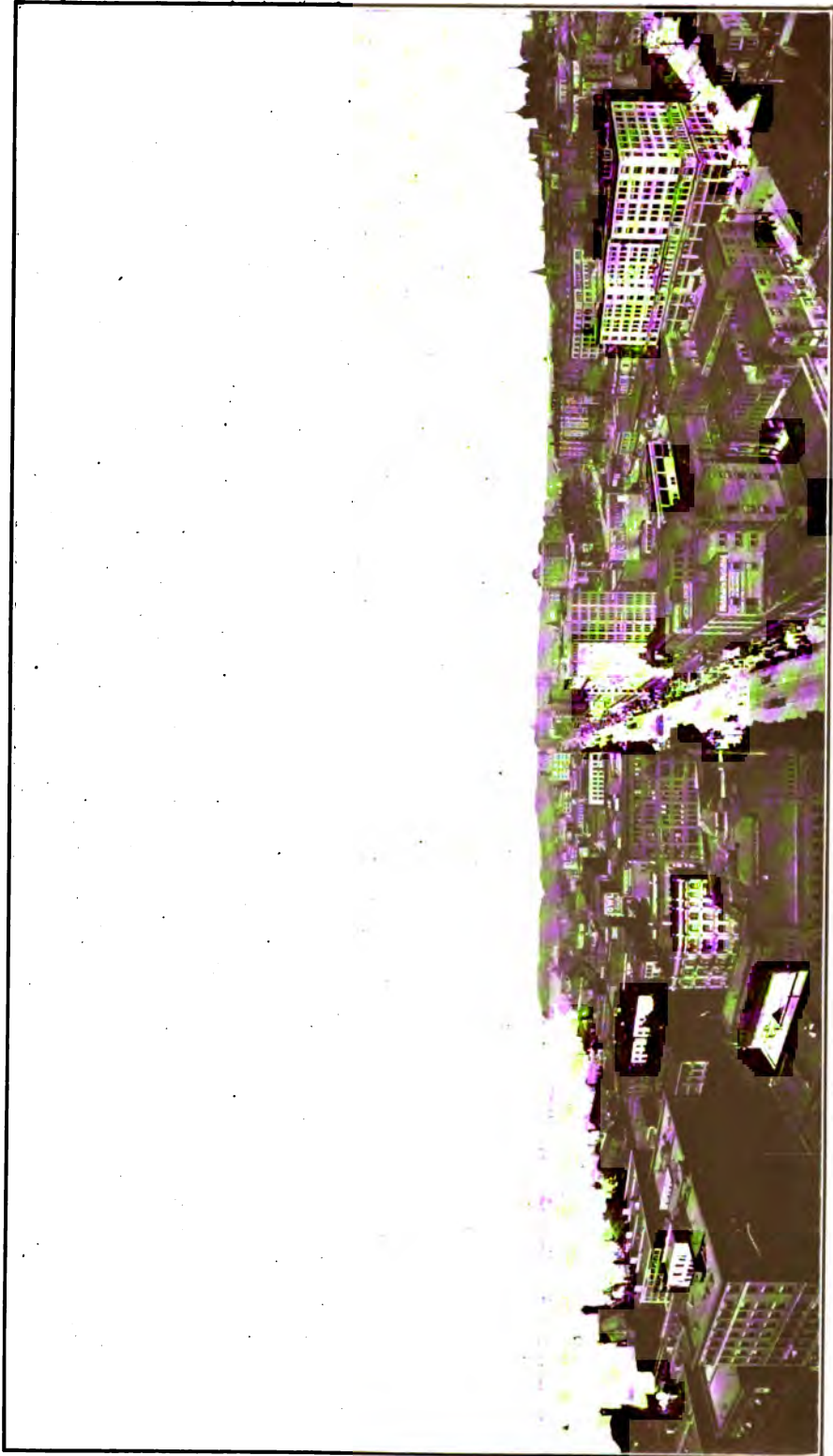
Since the organization of the city, \$36,-

560,000 have been expended on local improvement work, \$3,825,000 on the Cedar River Water Supply system, and \$115,000 on miscellaneous construction. The great bulk of the local improvement work in Seattle is carried on under a local improvement district assessment plan. Under this plan the city council may, either upon its own motion or as the result of a petition presented by interested property holders, order local improvements to be made in any part of the city, the whole or any designated part of the cost of which to be borne by assessments levied upon benefited property. Local improvement serial bonds extending over a period of ten years are issued in payment for this work, the property owner, however, being free to make payment of the whole cost at any time. The amount to be contributed from the general fund toward each of these various sums is determined by the city council in advance, but this amount in all cases is very small. The result of the use of this plan has been the securing for Seattle the largest mileage of permanent and complete streets per capita of any city in the country.

Public Utility Earnings.—The two public utilities producing notable revenues are the municipal lighting plant, the total cost of which to 1 Jan. 1912, was \$2,628,000 and the gross earnings from which for the year 1911 were \$727,400, and the municipal water system, the total cost of which to 1 Jan. 1912, has been \$9,563,000 and the gross earnings from which for the year 1911 were \$817,000.

Manufacture and Commerce.—Seattle is the commercial and industrial center of a large territory which contains very extensive natural resources, including coal, lumber, clay working, cement manufacture, fishing, mining and agriculture. There are, of various classes, 765 separate manufacturing establishments with an invested capital of over \$51,072,000, paying over \$14,900,000 per annum in wages. The average number of wage earners during the year 1911 was more than 12,400. This is exclusive of 51 steam laundries operating in the city with a capital of \$1,008,000, paying wages to the extent of \$912,000 and current expenses of \$219,000, employing 1,467 operatives and producing an output of \$1,697,000. The Seattle Construction & Dry Dock Company is equipped for the construction of vessels of any size, the United States battleship Nebraska having been built in its yards. The Puget Sound Naval Station has its operating base at Seattle, although the docks of this station are at Bremerton, about 12 miles west. Dry Dock No. 1 at this station is 627 feet long, 39 feet deep, 67 feet wide at the bottom, 130 feet wide at the top. Dry Dock No. 2 is 770 feet long on the floor, 820 feet long inside of coping at head to outer sill, 106 feet wide between faces of altars at sill level and 145 feet wide at coping, with a depth of 47 feet.

Banks and Finance.—There are 28 banks in the city of Seattle, the capital stock of the 26 chartered in the State amounting to \$6,665,000, the capital stock of the Bank of California and the Canadian Bank of Commerce being excluded. The deposits for the year 1911 were \$76,715,101, and the clearances \$552,640,350. The deposits in the year 1900 were \$17,401,450, and the clearances \$130,323,281.



SEATTLE, WASHINGTON.

SEAWEEDS



1. Gulf-weed (*Sargassum vulgare*)
2. Dead-Men's-Fingers (*Laminaria digitata*)
3. Wing-weed (*Laminaria esculenta*)
4. Bladder-weed (*Macrocystis pyrifera*)
5. Comb-weed (*Plocamium coccineum*)
6. Coral-moss (*Coralina officinalis*)
7. Horn-tangle (*Ceramium rubrum*)
8. Reed-weed (*Polysiphonia urceolata*)
9. Rib-weed (*Doleseria sanguinea*)
10. Irish Moss (*Chondrus crispus*)
11. Hide-weed (*Schizymenia edulis*)
12. Sea-lettuce (*Ulva latissima*)
13. Cladophora glomerata
14. Chandelier-weed (*Nitella flexilis*)
15. Chandelier-weed (*Chara fragilis*)

SEAWEED—SEAY

The customs collections at Seattle for the year 1911 were \$1,246,973. The collections for the year 1900 were \$281,545. The post-office receipts for the year 1911 were \$1,000,513; for the year 1900 they were \$186,762. The imports for the year 1911 were \$55,768,401 and the exports \$53,507,889. The building permits for the year 1910 were 13,224, for an estimated cost of construction of \$17,449,757. During the year 1911, corresponding figures were 11,198 permits for an estimated cost of \$7,916,769.

Population and History.—As has been well stated by Mr. James B. Meikle, former secretary of the Seattle Chamber of Commerce: "What is now the city of Seattle was at one time the home of several hundred Indians, and the occasional meeting place of thousands, who were attracted to this point as a convenient location for tribal assemblies. It was first settled by white men in 1852, when a few sturdy pioneers located upon the land under the provisions of the act of Congress of 27 Sept. 1850, known as the 'Donation Act.' In 1853 the town was laid out and called Seattle, after a friendly Indian chief of that name. It was incorporated in 1865 by the territorial legislature, and reincorporated in 1869. During the first 20 years its growth was slow, the population in 1870 numbered but 1,107. In 1880 it had increased to 3,533. With the advent of the railroad in 1884, the city entered upon a period of prosperity, which continued until the great financial depression in the early 90's. On 6 June, 1889, the main portion of the city was destroyed by fire. A territory nearly 100 acres in extent was burned over, causing losses aggregating more than \$10,000,000. Undaunted by this great disaster, the people went to work at once, and within a year they built a new and better city with wider streets, better grades and buildings constructed according to modern ideas. The census taken in 1890 showed a population of 41,847. During the financial depression following 1902, Seattle, in common with the other Pacific coast cities, remained practically at a standstill; but, with the wonderful discoveries of gold in Alaska and the Yukon Territory in 1897, and the rapid development of commerce with the Orient since the Spanish-American war, attracting the attention of the capitalists of the world, the city entered upon an era of prosperity and progress, which has continued to the present time. In 1900 the population was 80,671; in 1910, it was 237,194, an increase of more than 190 per cent in 10 years."

REGINALD H. THOMSON,
Formerly City Engineer.

Sea-weeds, the simpler kinds of plants which grow in the water. The term is restricted to the lower plants, and does not include the aquatic kinds of mosses, liverworts, fernworts, and flowering plants. (See ALGÆ.) Originally the term was applied exclusively to the plants which live in the seas and oceans, but these are now called "marine seaweeds" to distinguish them from the "fresh-water seaweeds" which grow in rivers, lakes, and ponds. The simplest of all plants, the blue-green slimes (*Cyanophyceæ*) are the lowest of the seaweeds. They occur mostly in fresh waters; some, however, are marine. The green seaweeds (*Chlorophyceæ*) are of considerably higher organization, the

cells being distinctly nucleolated, and possessing well defined chromatophores, in which the green coloring matter resides. They include such single-celled types as the common green slimes (*Protococcus*), desmids, diatoms, the filamentous pondscums, green felts (*Vaucheria*), as well as some larger leaf-like and massive kinds (*Ulva*, *Caulerpa*, *Codium*, etc.). They occur abundantly in both fresh and salt waters throughout the world.

The brown seaweeds (*Phæophyceæ*) are closely related to the green seaweeds, and differ from them mainly in having an additional brown coloring matter which hides the green color of the chromatophores. The simplest forms are minute few-celled plants, others are branching filaments, while still others are large, massive plants many feet in length, and composed of root, stem, and leaves. In all the mode of reproduction is of a simple type, showing their low grade in spite of the great size of some of the species. Among the larger plants of this group are the kelps (*Macrocystis*, *Lissonia*, etc.), devil's aprons (*Laminaria*) and rockweeds (*Fucus*). Some Pacific species of the first named genus attain a length of several hundred feet, and are doubtless the longest plants in the world. Nearly all brown seaweeds are marine; a few only living in fresh waters. The red seaweeds (*Rhodophyceæ*) are by far the most beautiful and interesting of aquatic plants. They are of a higher organization than those of the preceding groups. A few are composed of simple slender filaments, but they are more commonly multicellular stems, with roots below, and leaf-like or finely divided branches above. Although they are green plants, having well developed chromatophores in their cells, they have in addition a reddish or purplish coloring matter which hides the green color. This often gives them a beautiful color, which, added to their delicate and regular branches, makes them exceedingly attractive objects of study. They are commonly collected by seaside visitors, under the name of "sea mosses." A few species live in fresh waters, all the others being marine. Some species are edible, as notably the so-called "Irish moss" (*Chondrus crispus*) of the Atlantic coast of America and Europe, from which is made the delicacy known as *blanc mange*. The highest of the seaweeds are the stonewarts (*Charophyceæ*), which resemble some of the red seaweeds, but are of a green color, the red coloring matter not being developed in them.

CHARLES E. BESSEY,
University of Nebraska.

Seawell, sē'wēl, Molly Elliot, American author: b. Gloucester County, Va., 23 Oct. 1860. Being thrown upon her own resources in 1886, she began writing stories and sketches; with her 'Little Jarvis' she took a prize of \$500 in 1890 offered by 'The Youth's Companion,' and with 'The Sprightly Romance of Marsac' in 1895 took the prize of \$3,000 offered by the New York Herald. Among her published books are: 'Midshipman Paulding' (1891); 'Paul Jones' (1892); 'Decatur and Somers' (1894); 'A Strange, Sad Comedy' (1895); 'A Virginia Cavalier' (1896); 'Children of Destiny' (1903).

Seay, sâ, Abraham J., American soldier and politician: b. Amherst County, Va., 28 Nov. 1832. He entered the Federal army as a private

SEBACEOUS GLANDS — SEBASTIAN

in 1861, and served in 28 battles and skirmishes and rose to the rank of colonel. In 1872 and 1874 he was the unsuccessful candidate for Congress; was a circuit judge 1875-7, and Republican nominee for judge of the Court of Appeals, eastern district, Ohio, in 1888. He was the supreme judge of Oklahoma 1890-2, and governor of that territory in 1892-3, when he was removed by President Cleveland.

Sebaceous Glands, small structures of glandular nature and sacculated form which exist in the substance of the corium, or deep layer of the dermis or true skin. They are very generally distributed over the entire skin-surface, but are most numerous in the face and scalp. Those of the nose are of large size, and may frequently become enlarged from the accumulated secretion of the glands; while the largest in the body are the sebaceous glands of the eyelids, the Meibomian glands (see **EYE**). Around the orifices of the mouth and anus, nose, and external ear, these glands are found in numerous array; but they appear to be absent from the skin of the palms of the hands and soles of the feet. Each sebaceous gland consists essentially of a lobulated or sac-like structure opening by a single efferent duct. The wall of the sac, as well as that of the duct, is lined by cells of cubical epithelium. These cells secrete the sebaceous matter which collects in the gland, the cells becoming transformed into the secretion and breaking down in the process. The separate sacculi, or little pouch-like divisions which make up each gland, may vary in number from 2 or 5 to 20. As a general rule the ducts of the sebaceous glands open into the hair-follicles, or sac-like involutions of the skin which surround and enclose the roots of hairs. But in many cases the ducts open simply on the external surface of the skin. There are generally two sebaceous glands in connection with each hair. A curious little parasitic mite, harmless in its nature—the *Demodex folliculorum*—is frequently found inhabiting the sebaceous ducts of the nose, especially when their secretion is pent up. This little organism is not known to occur elsewhere.

The sebaceous glands are first developed in the sixth month of embryonic life, and appear in their earliest condition as sac-like appendages to the hair-follicles. The secreting cells, containing fat particles, appear in the centre of the developing gland; these cells gradually enlarge and, escaping by the root or attached portion of the sac, constitute the first secretion of the gland. The functions of the sebaceous secretion are chiefly those of keeping the skin moist and from being cracked by the influence of heat and of the air. Friction between skin surfaces is also diminished in the same manner by the sebaceous secretion. The secretion is present in greatest amount in those races which inhabit warm climates and are greatly exposed to the sun's heat. See **HAIR**; **SKIN**.

Sebago (sĕ-bă'gō) **Salmon**, the land-locked salmon of Sebago Lake, Maine, and a few neighboring inland waters, which has lately been widely distributed through fish-cultural operations. It was long regarded as a mere land-locked variety of the Atlantic salmon (q.v.), but Jordan and Evermann consider it entitled to rank as a species (*Salmo sebago*) distinct from

that and from the Ouananiche (q.v.). In Sebago Lake it averages about 10 pounds in weight. Its habits are like those of the typical species with such modifications as the physical differences between the ocean and lake make necessary. "In Sebago Lake in the fall, structural and chromatic changes occur, and it ascends tributary streams to spawn. After this function is performed it returns to the lake, which is its ocean, and resorts to deep water. In the spring as soon as the ice breaks up, when smelts, upon which it extensively feeds, are running up the streams to spawn, the salmon follow them." Consult Jordan and Evermann, 'Food and Game Fishes' (New York 1903), and American angling authorities generally.

Sebastian (sĕ-bās'ti-an), **Saint**, a saint of the Roman Catholic calendar: b. Narbonne, Gaul, toward the end of the 3d century; d. Rome 20 Jan. 288. His position as captain in the Prætorian Guard at Rome gave him many opportunities of spreading Christianity, and protecting its adherents; but he was finally arrested and carried before Diocletian. The emperor ordered him to be shot to death by archers. A Christian woman named Irene, finding him still alive, drew out the arrows, took him home, and nursed him till he recovered. He then presented himself before Diocletian, and remonstrated with him for his cruelty; whereupon the emperor ordered him to be beaten to death, and his body to be thrown into the common sewer, whence it was taken by another Christian woman, called Lucina, who buried it at the feet of the apostles, Peter and Paul. In the 9th century his relics were carried to Soissons, whence they were dispersed through France, Spain, Germany, and the Netherlands. A church was erected to this saint by Pope Damasus. Saint Sebastian is invoked against the plague, and is considered the patron saint of marksmen. His day is the 20th of January. There are many pictures of this saint by the Italian and other painters. He is generally represented as a beautiful youth tied to a tree, and transfixd by arrows. The most famous pictures of his martyrdom are those by Luini, Bassi, Mantegna, Holbein, Paul Veronese, and Ribera. In the cathedral at Lucca the subject has been treated in sculpture by M. Civitali.

Sebastian, **Dom**, king of Portugal: b. 1554. He was the posthumous son of the Infant John by Joanna, daughter of Charles V., and ascended the throne in 1557, at the death of his grandfather, John III. During his minority the government was conducted by his uncle, Cardinal Henry, brother of Emanuel the Great. He was educated by his guardian, Catharine of Austria, wife of John III. (sister of Charles V.). He was imbued with religious enthusiasm and a chivalrous desire to undertake a crusade. His constant dream was the conversion of Asia and Africa to Christianity, and the subjection of these continents to Portugal. At 20 he made an expedition to Ceuta, Tangier, and Magazar, the only possessions that remained to the Portuguese from former conquests in Africa. From these places he suddenly fell upon the unsuspecting inhabitants, and although no material results ensued, his lust for conquest became more confirmed. Soon afterward (1578) a war of succession broke out in the kingdom

of Fez and Morocco. Mulei Moluk, the youngest son of the last emir, had, contrary to his father's will, been excluded from the throne, but with foreign aid had finally succeeded in conquering his hereditary kingdom, and compelling his nephew, Mulei Mohammed, who had usurped it, to flee. The latter sought aid from Sebastian, who yielded to the request, hoping to effect something for Christianity and the fame of Portugal. In spite of the admonitions of his counsellors, he equipped a fleet and an army, part of which he had collected in Spain, Germany, and Italy, and sailed for Africa, 24 June 1578. The expedition reached Tangier in safety, but at Alcazarquivir was met by the far more numerous host of Mulei Moluk. Here on 4 Aug. 1578, a decisive battle was fought, in which Sebastian was completely defeated. Almost all his followers, including the best of his nobility, were either slain or taken prisoners, and he himself was among the missing. A corpse supposed to be the king's was found, but it was disfigured with so many wounds that identification was impossible. His death in consequence remained doubtful and gave occasion to the rise of several pretenders, the most notable of whom appeared in Venice 20 years afterward, and, after various vicissitudes, succeeded in arousing the sympathy of all Europe. Faith in his pretensions eventually subsided and he lapsed into obscurity. Consult D'Antas, 'Les faux Don Sebastien' (1865).

Sebastiano del Piombo, sã-bãs-tẽ-ã'nõ dẽl pẽ-m'bõ. See PIOMBO, SEBASTIANO DEL.

Sebastopol, sẽ-bãs-tõ-põl or sẽb-ãs-tõ'põl, or **Sevastopol** (Russ. sã-vãs-tõ'poly), Russia, in the government of Taurida, an important seaport in the southeast of the Crimea, on a harbor famed for its excellence—an inlet of the Black Sea, 4½ miles long; ½ mile wide at the mouth and 1 mile wide further inland, afterward averaging ½ mile across. Depth from 3 to 11 fathoms. It is enclosed by high limestone ridges, and is accessible to the largest ships. The River Tchernaya enters the harbor at the east. The principal part of the town occupies a slope between South Bay or Dockyard Harbor, and Quarantine Bay. Prior to the destruction of the town (1854-5) it was solidly built; the forts were marvellous strongholds mounted by 700 guns and the docks were among its most important works. The dock basin was supplied with water by a canal from the Tchernaya. The town was almost unprotected on the interior side, but the temporary defenses erected by Gen. Todleben, during the Crimean war (the most formidable of which were the works of Malakoff and Redan) have since that time become celebrated. These works were, however, at last captured, at the end of a memorable siege of the allied French and English forces, the Russians retiring after the town had been ruined. The French and English engineers then blew up the docks and forts, which, by the Paris treaty (1856) were not to be rebuilt. These restrictions were annulled in 1871 by the London conference. The docks and forts were restored by the Russian government in 1885, and Sebastopol is now again the naval port for the Black Sea fleet. The town has been partially rebuilt—it was once an important commercial port, but Kaffa (q.v.) has taken its place since 1899, in

this regard. The value of imports entering this port was formerly over \$5,000,000; of exports, \$15,000,000. Sebastopol was founded on the site of Akhtiar in 1783, by Catharine II. Many historical reminiscences render this an interesting spot. The promontory where the town now stands was once occupied by the temple where Iphigenia, daughter of Agamemnon, officiated as priestess. Later, Greeks colonized the promontory, but were overcome by the Genoese, who established themselves at Balaklava. The ruins of the Genoese castles are still to be seen. Pop. about 53,000.

Sebillot, sã-bẽ-yõ, Paul, French folklorist: b. Matignon, France, 6 Feb. 1843. He was educated at the communal college of Dinan, studied law at Rennes, and established himself in Paris as a notary, but soon abandoned the law for art. From 1870-83 he exhibited about 20 pictures at the Salon, but his travels through Saint-Brieuc, Pont-Aven, and various out-of-the-way sections of Brittany aroused an interest in folklore, and he gradually drifted from art to the study of folklore, on which he wrote a series of excellent books. He succeeded to Henri Martin's seat in the commission for Megalithic Monuments, became *chef du cabinet* at the ministry of public works, and in 1889 chevalier of the Legion of Honor. From its foundation in 1885 he was editor of the 'Revue des Traditions Populaires.' His works include: 'Contes Populaires de la Haute-Bretagne' (3 series, 1880-1-2); 'Légendes, Croyances, et Superstitions de la Mer' (2 vols., 1886-7); 'Littérature orale de l'Auvergne' (1898); 'Le Folklore des pecheurs' (1901); 'La mer fleurie le rivage Marius et corsaires' (1903); etc.

Secale, in botany, rye, a genus of the *Triandria Digynia* class and order, in the natural order of *Gramina* or grasses. Essential character, calyx opposite, two-valved, two-flowered, solitary. There are four species: the villosum, orientale, creticum, and cereale. *Secale villosum* or wood-rye grass is distinguished by a calyx with wedge-shaped scales, and by the fringe of the glume being woolly. The glumes of the *secale orientale* are shaggy and the scales of the calyx are shaped like an awl. The glumes of the *secale creticum* are fringed on the outside. The *secale cereale* or common rye has glumes with rough fringes. There are two varieties, winter and spring rye. The winter rye, which is larger in the grain than the spring rye, is sown in the autumn, at the same time with wheat, and sometimes mixed with it; but as the rye ripens sooner than the wheat, this method is exceptionable. The spring rye is sown along with oats, and usually ripens as soon as the winter rye; but the grain produced is lighter and it is therefore seldom sown. See RYE.

Secchi, sãk'kẽ, Angelo, Italian astronomer: b. Reggionell', Emilia, 29 June 1818; d. Rome 26 Feb. 1878. He entered the order of the Jesuits in 1833, and after teaching in various Jesuit colleges, including that at Georgetown, D. C., he was in 1849 appointed professor of astronomy and director of the observatory at the Collegio Romano. When the Jesuits were expelled from Italy in 1870 he was permitted to retain his position. Father Secchi's services to astronomy were of the utmost value. He made a careful study of the physical constitution of the sun,

the nature of sun-spots, and the solar prominences, but of much greater importance was his pioneer work, carried out with less perfect instruments contemporaneously with that of Huggins in stellar spectroscopy or astrophysics. He made the first systematic spectroscopic survey of the heavens, and proposed a classification of stellar spectra under four main types, which has proved a valuable basis for subsequent research. Among his works are: 'Catalogo delle Stelle di cui si è determinato lo Spettro luminoso' (1867); 'L'Unità delle Forze fisiche' (1869); 'Le Soliel' (1870); 'Le Stelle' (1877). Consult: Pohle, 'Angelo Secchi' (1883).

Secession, the act of withdrawing from, a term of great political importance, especially in the history of the United States. Whenever a State has claimed the right to withdraw from the Union, it has based its claim on the doctrine of State sovereignty. This claim must be considered as emphatically distinct from the right of revolution, insurrection, or violent revolts, in all of which there is no claim technically of legal right, and the appeal of which is to force instead of reason. Nearly every State of the Union, in its turn, has advanced the right of secession, and usually each has been condemned by the others as treasonable. This claim was specifically brought forward or involved in the Kentucky "Resolutions," the Hartford "Convention," and the "Nullification Ordinance" (qq.v.). The election of Abraham Lincoln to the Presidency of the United States in 1860, when the political situation was flanked with sectional differences resting on State claims, was all that was necessary to change the theory of secession in the South into an attempt to effect the reality. South Carolina took the lead. No single State was prepared or willing to secede alone, but Florida, Mississippi, and Alabama agreed to secede with any other State. Again South Carolina was leader in calling a State convention, and on 20 Dec. 1860 the Act of 1788, ratifying the National Constitution, was repealed, and it was declared "that the union now subsisting between South Carolina and other States, under the name of the United States of America, is hereby dissolved." A declaration of the causes for this act was formulated, and was adopted on the 24th. The governor proclaimed "the secession of South Carolina" the same day. Mississippi was the first to follow this example 9 January 1861; then in succession came Florida, 10 January; Alabama, 11 January; Georgia, 19 January; Louisiana, 26 January; and Texas, 1 February, though in the case of this last State the proceedings were irregular. Virginia followed in April; Arkansas and North Carolina in May; and Tennessee in June. The Civil War was the consequence, and its final issue was the victory of the Union government and the full federation of the United States of America. See SECESSION IN THE UNITED STATES; UNITED STATES — *Secession*; CIVIL WAR.

Secession in the United States. To properly understand the causes which led to the secession of the Southern States in 1861 and the reasons which actuated those by whom such action was advocated, we must confine our investigations to the history of the country and the conditions which existed prior to the dates when the seceding States withdrew from the Union. If we look back from the standpoint of

to-day the events of nearly half a century intervene and we see but little of the picture which was presented at that period. We must study the theory of the Constitution as it was understood and explained by the creators of that instrument, and the history of the period prior to 1861, at least so far as it relates to constitutional rights and construction. It will also be interesting and instructive to consider the views entertained by the advocates of the State Rights doctrine as distinguished from the views of the extreme nationalists, and we must also become informed regarding the long continued struggle between the leaders of these two parties. In 1860 not only the leaders but the Southern people generally were firm in the belief that a State had the legal right to secede from the Federal Union. This was the natural result of the teachings of more than half a century. Whatever opposition existed in the several State conventions or among the people of the seceding States arose not on the question of the principle of secession, the right to secede, but upon the expediency of seceding. Perhaps the most conspicuous example of the unity of the people of the seceding States is to be found in the proceedings of the Alabama Convention. A very large minority of this convention, for a while supposed to be a majority, was elected on the following platform: "That we hold it to be our duty, *first*, to use all honorable exertions to *secure* our rights in the Union, and if we should fail in this, *we will maintain* our rights *out of the Union*; for, as citizens of Alabama, we owe our allegiance first to the State; and we will support her in whatever course she may adopt."

With rare exceptions the arguments against such action were on the ground that it was inexpedient and unadvisable, but when the act was consummated it was generally recognized in the seceded States as the supreme law of the land, the exceptions being for the most part confined to a few counties in East Tennessee and the sparsely inhabited strip of mountain land known as the southwestern part of the Alleghanies. In this connection it is important to state that in 1861 and for years prior to that time this belief in the right of secession was by no means confined to the South, or to the so-called pro-slavery party. Horace Greeley, editor of the New York *Tribune*, was outspoken in upholding the right of secession, and for months after the establishment of the Confederate government, army officers from the South openly discussed the question of remaining in the Union army or joining the Confederacy, and those who decided upon the latter course were allowed to go freely.

General Joseph E. Johnston and Colonel Robert E. Lee both continued in the performance of their army duties in Washington for nearly two months after the inauguration of President Lincoln, the former holding the all important position of quarter-master-general of the army of the United States; and it was after it was generally known that Colonel, afterward General Lee had decided that it was his duty to give his fealty to his native State, Virginia, that Mr. Lincoln offered him the appointment as commander-in-chief of all the armies of the United States. At that time the authorities in Washington did not use the words *treason* and *traitors* in referring to the Southern officers

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who resigned their commissions and joined the Confederate army. But the results of the appeal to arms whereby the advocates of secession were overwhelmed, have clouded and caused to be utterly forgotten the legal and logical principles for which the States Rights party had contended for three quarters of a century.

Greeley said in 1860: "War is a hideous necessity at best, and a civil conflict, a war of estranged and embittered fellow countrymen, is the most hideous of all wars." (New York Tribune, 16 Nov. 1860.) And his words were prophetic. In the terrible internecine war of four years more than 1,000,000 human beings, most of whom were the youth of the land, fell in battle or succumbed to disease and the hardships of campaign, or were wounded and maimed; while in nearly every home, North and South, heartbroken mourners were crushed by the awful sacrifice to the God of Battles. During and at the close of the war every branch of the government was under the control of those responsible for the coercive policy which brought it on. With rare exceptions the whole press of the Northern States and its literature were dominated by the same influences. The chief executive and all his subordinates in the government with one acclaim pronounced the edict that those who had not supported their views should be made odious to the American people, and from that time the teaching to the youth of the land has been of this character. The causes which influenced the action of those who brought about the secession of the Southern States became utterly obscured and forgotten.

Causes of Secession.—The general assumption that slavery was the sole cause of secession and the war that followed is very far from correct. It is clearly to be seen that far away and beyond the question of slavery, even in the very earliest days of the life of the nation, the two parties began the struggle—the one to maintain the unrelinquished rights of the States, the other to establish and vest greater power in the central government. But although this leading question, and other cognate questions were really at issue in this conflict, slavery was the proximate occasion of the Civil War. The anti-slavery agitation focused and brought into active operation the theories of the extreme nationalists that the central government had the right to go into the domain of State governments and regulate their domestic affairs. And the threats of the abolitionists awoke the southern people to the realization that the guarantees of the Constitution for the protection of slave property were to be nullified and, at least to that extent, the rights of the States destroyed. It is therefore necessary to review the history of this contributing, if not paramount, cause, without entering upon any discussion of the question of slavery itself.

History of Slavery.—Slavery was not only a heritage from the mother country, but the history of early colonial times shows that it was a forced heritage that was resisted and opposed by the colonies. In the same spirit the Southern people opposed slavery at the time of the Declaration of Independence and were vigorous in resisting the further importation of slaves from Africa. The wise men of that day foresaw the evils attending such a traffic. Its enormous profits would cause a further great influx of

people hardly removed from savagery. But when slavery became a fixed institution, recognized, guaranteed and protected by the Constitution, the people of the South sought to ameliorate so far as possible, all the evils attending it. Slavery was part of the common law of England prior to the settlement of the first colonies in America, and became the common law of the colonies; and at the time of the Declaration of Independence existed in each of the thirteen colonies. As above stated, this condition existed despite the efforts of some of the colonies to terminate it. Judge Cooley in his continuation of Story's 'Commentaries on the Constitution,' says: "No colony was so persistent in its efforts to check the [slave] trade as Virginia, and Judge Tucker enumerates twenty-three acts on the subject, beginning with 1699." Georgia, under Oglethorpe, prohibited the importation of slaves until 1752, when the proprietors surrendered the charter and the colony became part of the royal government, when the power of the colonists to prevent the importation of slaves ceased, the Crown prohibiting the exercise of any such power by the colonists. In 1760 South Carolina passed an act prohibiting the further importation of African slaves. The act was rejected by the Crown, the governor was reprimanded; and a circular was sent to all the governors of the colonies warning them against presuming to countenance such legislation.

England not only considered the slave trade beneficial, and fostered and protected it, but had actually inaugurated and established it. Its first appearance in history is in the grant of a charter by Queen Elizabeth to a company formed to supply African slaves to the Spanish-American colonies—the queen herself being a shareholder in the company. In 9th and 10th William III. an act was passed reciting that "the trade was highly beneficial and advantageous to the kingdom." In 1708 the House of Commons resolved: "That the trade was important, and ought to be free and open to all the queen's subjects trading from Great Britain." And as late as 1775 the Earl of Dartmouth, in answer to a remonstrance from the agent of the colonies, said: "We cannot allow the colonies to check or discourage in any degree a traffic so beneficial to the nation." And so popular was this traffic that slaves were openly sold in the public squares of London. Thus were the efforts of the colonies, led by Virginia, Georgia, Maryland, and South Carolina, to put an end to the traffic, thwarted by the greed of the traders in the mother country.

The first African slaves imported into America were landed by a Dutch trading vessel at Jamestown in 1620, and from that time the traffic became general throughout all the colonies. Pecuniary profit to the traders and the need of the negro as a laborer was not the only incentive to this traffic. The press and even the pulpit contended that it was humane and Christian to bring these heathen savage negroes to the protective care of civilized people. Slaves were imported in large numbers into New England until it became apparent that they were not fitted to the rigorous climate of the North. Importation to the northern colonies and States gradually diminished and finally ceased, but New England ship owners continued for many years to be actively engaged in the business of im-

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porting and selling slaves. Notwithstanding the reasons in favor of this business the leaders of thought among the Southern colonists continued to fight against the traffic, and Jefferson, in his first draft of the Declaration of Independence, brought forth, as one of the counts in his indictment of the king, "this cruel war against human nature itself . . . this piratical warfare," and charged that the king had "prostituted his negative for suppressing every legislative attempt to prohibit or to restrain this execrable commerce" in order to keep open a market for the sale of human beings. Jefferson gave, among other reasons for omitting this clause from the final draft of the Declaration: "Our Northern brethren also, I believe, felt a little tender under those censures; for, although their people had very few slaves, yet they had been pretty considerable carriers of them to others." This traffic against which the colonies had waged war for a century continued to exist at the time of the Declaration of Independence; and when the Constitution was adopted slavery existed in every colony with the possible exception of Massachusetts, where in 1781, not by legislative enactment, but by a decision of the Supreme Court of that colony, it was declared inconsistent with the declaration of the Bill of Rights that "all men are born free and equal."

The framers of the Constitution (q.v.) realized the sensitive and delicate nature of the question of slavery, and wisely left it untouched except to protect the property rights of the slaveholders and to give to Congress the power to prohibit the importation of slaves after a certain date. The third paragraph of section 2 of Article IV. of the Constitution provided that "no person held to service or labor in one State, under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered upon claim of the party to whom such service or labor may be due." Under this clause Congress passed the Fugitive Slave Law (q.v.) of 1793. The first paragraph of section 9 of Article I. of the Constitution provided: "The migration or importation of such persons as any of the States now existing shall think proper to admit shall not be prohibited by Congress prior to the year one thousand eight hundred and eight, but a tax or duty may be imposed on such importation, not exceeding ten dollars for each person."

The history of the adoption of this clause sheds much light upon the attitude of the Southern slave-holders. The first draft provided: "No tax or duty shall be laid, etc., on the migration or importation of such persons as the several States shall think proper to admit; nor shall such migration or importation be prohibited." South Carolina and Georgia insisted that the freedom of importation should be limited, and insisted upon a limitation as a condition of the Union; and the clause limiting until 1808 the prohibition against Congress of preventing such importation was finally adopted.

During the period from 1787 to 1808 the question of prohibiting the importation of slaves was entirely under the control of the States, and every Southern State which had not already done so enacted laws prohibiting further importation of slaves. Jefferson's earnestness in opposing the traffic has already been noticed,

and Virginia was the first State to prohibit it. Georgia was the first State to incorporate such a prohibition in the Constitution. Henry Laurens of South Carolina writing to his son, 14 Aug. 1776, said: "You know, my dear son, I abhor slavery. I was born in a country where slavery had been established by British kings and parliaments, as by the laws of that country, ages before my existence. . . . Not less than 20,000 pounds sterling, would all my negroes produce, if sold at public auction to-morrow. I am not the man who enslaved them; they are indebted to Englishmen for that favor; nevertheless I am advising means for manumitting many of them, and for cutting off the entail of slavery. . . . I perceive the work before me is great."

Mr. Lowndes of South Carolina, speaking in the House of Representatives on 14 Feb. 1804, of the impossibility of prohibiting the importation of slaves into his State, said: "With navigable rivers running into the heart of it, it was impossible for us, with our means, to prevent our eastern brethren from introducing them (the negroes) into the country. The law was completely evaded."

In 1807 Congress passed an act prohibiting the importation of slaves into any part of the United States after 1 Jan. 1808. The vote in the House of Representatives was almost unanimous, being 113 against 5. Of the five who voted against it only three were from the South, one being from the Portsmouth district, New Hampshire, and one from Vermont. Mr. Betton from New Hampshire represented large shipping interests; and that the vote of Mr. Crittenden of Vermont was approved by the people of his State is shown by the fact that he was three times re-elected to Congress, and was subsequently elected governor and judge. This vote shows the absence of any sectional division of sentiment on the subject. In the meantime in 1784 Virginia had ceded to the United States the great Northwest Territory, and in 1787, before the adoption of the Constitution, the Congress had adopted the Ordinance for the Government of the Northwest Territory. This was adopted at the instance of Virginia, and its Sixth Article provided that "there shall be neither slavery nor involuntary servitude in the said Territory, otherwise than in punishment of crimes whereof the party shall have been duly convicted." In December 1805 the Legislative Council and House of Representatives of the Indian Territory petitioned Congress to suspend the operation of the Sixth Article, and petitions of numerous inhabitants of the Territory, together with a letter of William Henry Harrison, governor of the Territory, of the same purport, were forwarded to Congress. These petitions were referred to a committee of seven members consisting of representatives from Virginia, Pennsylvania, Ohio, New York, Kentucky, and South Carolina, who reported favorably to the petition, but no final action was taken by Congress. In January 1807 a letter from Governor Harrison enclosing resolutions unanimously adopted by the Legislative Council and House of Representatives of Indiana, petitioning for the suspension of the Sixth Article and for the introduction of slavery, was laid before Congress. The matter was again referred to a committee whose members were drawn from various sec-

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tions of the country. The committee again reported favorably, the House adopted a resolution suspending the article, but the Senate failed to concur in it and the matter was dropped.

Although the importation of slaves was prohibited the institution of slavery became more firmly entrenched in the slave-holding States, and at the same time a sentiment in favor of its abolition grew stronger in the non-slave-holding States. In 1819 a violent dispute arose between the North and South, the occasion being the proposal to admit Missouri as a State. After a year of bitter controversy a settlement was reached in a compromise whereby Missouri, with a constitution permitting slavery, was admitted, but as to the remaining portion of the territory of the United States lying north of lat. 36° 30' N., it was provided that slavery should be prohibited. In the North the compromise was exceedingly unpopular, and a general movement looking toward the abolition of slavery was commenced. In 1840 and in 1844 the anti-slavery party had presidential candidates in the field. The annexation of Texas, the war with Mexico and the further acquisition of territory furnished cause for additional controversy. In 1848 the anti-slavery party showed growing strength, and political campaigns took on increasing bitterness. The one side depended upon the guarantees of the Constitution to protect its property rights; the other insisted upon their right to prevent the extension of slavery, "while conceding," as Judge Cooley admits, "that the Federal government was powerless to disturb it in the States." During these times of fierce controversy the greatest minds from all sections of the country devoted their efforts to securing peace. Clay, Webster, Cass and Benton met in harmony and by their united efforts secured the compromise of 1850 by which California was admitted as a free State, new States were to be permitted to be carved out of Texas, the slave trade was prohibited in the District of Columbia, and new Territories were to be organized without either expressly permitting or prohibiting slavery. But these compromises, and all the efforts of the peacemakers were futile. The Missouri Compromise was repealed, the fugitive slave law was nullified in the North, in Kansas armed conflicts occurred between the opposing factions, and in October 1859 John Brown with a band of Northerners made a raid into Virginia in an endeavor to incite the negroes of the South into insurrection, rapine, and bloodshed.

The almost unanimous sentiment, North and South, upon the question of reopening the African slave trade is shown by the vote on the following resolution introduced in the House of Representatives by Mr. Orr of South Carolina, on 15 Dec. 1856: "Resolved, That it is inexpedient, unwise and contrary to the settled policy of the United States, to repeal the laws prohibiting the African slave trade." This resolution was adopted by a vote of 183 to 8, and most of those voting against it explained their votes by stating that no proposition looking to the opening of the slave trade having been presented the resolution was out of place. In 1856 the anti-slavery party had made great progress and came near electing their candidate for President. It was hoped that the decision of the Supreme Court in the Dred Scott case (q.v.) would put

an end to the political agitation, but the decision being adverse to the theories of the abolitionists added fuel to the flame. The Supreme Court and the venerable Chief Justice became objects of the most venomous abuse. In the controversy which now raged moderation and reason seemed annihilated in the bitterness of feeling. The ablest minds of the North were exercised in constructing arguments to justify the coercive policy. Floods of anti-slavery literature were poured out before the impressionable youth. The pulpit and the lecture hall rang with appeals in which slander and denunciation were the key-notes, and the press took up and echoed their appeals.

While many people in the North were actuated solely by the belief that slavery was a wrong that should be abolished yet it was not until the question became one of national and political importance that the party opposed to the one in power used it as a means to secure control of the government. Like all other questions which become political, misrepresentations of the grossest character were made in order to attain political ends. Therefore the pictures of slavery as presented to the Northern mind were in marked contrast to actual conditions as seen by those who were surrounded by them. It is true that there were exceptional cases where there was apparent cruelty, and some cases where the slaves endured real hardships; and these cases were almost exclusively confined to the Mississippi and other alluvial bottom lands where the slaves were removed from the care and protection of their masters and were controlled by overseers, whose sole effort was each year to attain the highest financial results for their employers. But while the cases of hardship were few in number they were seized upon, colored and exaggerated in order to, so far as possible, inflame the Northern mind against the institution. The conditions as they appeared to the Southern people, were, with rare exceptions, in marked contrast with the tales spread in the North. The planter of the South, or his ancestors, had seen the most degraded of human beings brought from Africa. Most of them had been, in their native land, slaves of tyrannical and cruel negro masters. They had become the property and in a certain sense members of humane, Christian families. The instincts of humanity and the interests of ownership had combined to lift these negro slaves from the lowest conditions of savagery into a state of civilization, where they were well fed, well clothed, protected, and all their physical wants attended to, and furthermore where they were uplifted morally, surrounded by Christian influences and given Christian instruction. While slavery had its evils, history has record of no people who made so rapid an advance from a low condition of savagery and immorality to one of comparative civilization and moral responsibility as was shown by the improvement in the condition of the savage negroes that were brought to this country by the slave-traders. It has been charged that the Southern people took care of their slaves only because they were property and because the loss of a slave was a monetary loss. This charge is unjust in the extreme, and is in line with other calumnies which would deny all humanity to the slave-holding Southerners. The Southern people as

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a class cared well for their slaves, not only because they were property, but also because there was a real bond of affection between the master and the slave, and between all the members of the master's family and all the slaves in his house or on his plantation. Proof of the real conditions can be found in the following extract from Booker T. Washington's 'Up From Slavery':

One may get the idea, from what I have said, that there was bitter feeling toward the white people on the part of my race, because of the fact that most of the white population was away fighting in a war which would result in keeping the negro in slavery if the South was successful.

In the case of the slaves on our place this was not true, and it was not true of any large portion of the slave population in the South where the negro was treated with anything like decency. During the Civil War one of my young masters was killed, and two were severely wounded. I recall the feeling of sorrow which existed among the slaves when they heard of the death of "Marse Billy." It was no sham sorrow, but real. Some of the slaves had nursed "Marse Billy"; others had played with him when a child. "Marse Billy" had begged for mercy in the case of others when the overseer or master was thrashing them. The sorrow in the slave quarter was only second to that in the "big house." When the two young masters were brought home wounded, the sympathy of the slaves was shown in many ways. They were just as anxious to assist in the nursing as the family relatives of the wounded. Some of the slaves would even beg for the privilege of sitting up, at night to nurse their wounded masters. This tenderness and sympathy on the part of those held in bondage was a result of their kindly and generous natures. In order to defend and protect the women and children who were left on the plantations when the white males went to war, the slaves would have laid down their lives. The slave who was selected to sleep in the "big house," during the absence of the males was considered to have the place of honour. Any one attempting to harm "young mistress" or "old mistress" during the night would have had to cross the dead body of the slave to do so. I do not know how many have noticed it, but I think that it will be found to be true that there are few instances, either in slavery or freedom, in which a member of my race has been known to betray a specific trust.

As a rule, not only did the members of my race entertain no feelings of bitterness against the whites before and during the war, but there are many instances of negroes tenderly caring for their former masters and mistresses.

As a general rule (the exceptions being in the bottom lands where but few white people lived except the overseers, and where the worst and most untractable negroes were sent) the virtue of the negro women was carefully guarded by the slave-owners, and for several reasons. First, the Southern people were, as they are to-day, essentially religious and, as above stated, took great care of the moral training of the negroes. In most of the small establishments the mistress of the house assumed this as one of her duties, and on most of the large plantations where there were from 100 to 1,000 slaves, a chapel was provided and a minister employed to teach religion and morals. A plantation upon which there were no mulatto children was the more valuable, and conveyed an idea of commendation which attached to all who were connected with it. In the third place marriage and chastity among the slaves were fostered and promoted for property reasons. So far did the Southern people go in protecting the female slaves that regular patrols were organized for the purpose of arresting and punishing the lower class of white men who prowled around at night among the negro cabins. Of course the Southern people were greatly incensed by the gross misrepresentations as to their cruelty and immorality,

and believed that the object of these misrepresentations was to arouse a sentiment which would lead to the attempt of the Northern people, acting through the national government, to interfere with the right of self government guaranteed by the Constitution, and to deprive them of their property. And the feelings of resentment which naturally followed, widened the breach day by day, month by month and year by year; until it became apparent that only a cessation of the agitation could prevent complete separation of the two sections. So that from the moment of the John Brown raid into Virginia the South saw the necessity of preparing to protect its rights and property—in the Union if possible—out of it if necessary. These were the conditions when, in 1860, the anti-slavery or Republican party elected its candidate, not so much by the strength in the North of its own following as by the division among the Democrats. By the vote which elected Mr. Lincoln the South was given to understand that the Constitution was to be disregarded and slavery destroyed, and so destroyed as to bring financial ruin, if not utter annihilation upon the South, for Wendell Phillips, a recognized leader, has said: "The state of things is just what we have attempted to bring about. . . . The Republican party is a party of the North, pledged against the South." And the Southern people turned to the remedy which for three quarters of a century they had believed to be the legal and proper one for denial of rights by the national government, namely, withdrawal from the Union—secession.

The Doctrine of Secession.—As stated from the foundation of the federal government until 1861, and even at that date, the right of secession was insisted upon not only in the South but in the North. In fact New England had been the first to advocate and threaten it. To discover the basis of this doctrine the history of the federal government must be briefly reviewed. The colonies were settled by the Cavaliers in Virginia, the Puritans in New England, the Hollanders in New York, the Catholics in Maryland, the Quakers in Pennsylvania, the Huguenots in South Carolina and the followers of Oglethorpe in Georgia. The colonists of New England whose descendants spread westward were very different in their ancestry, their education, their beliefs, and their customs, from those who settled the South and whose descendants spread over the southwest. Those of New England were largely the descendants of the round-heads of England, and entertained ideas similar to theirs. Those of the South sprang from the Cavalier class of England and France. The colonial States when they renounced their allegiance to Great Britain were separate and distinct commonwealths, entirely independent of one another. The desire for complete independence was the claim that welded their union in their efforts to achieve their common end. The political union of these independent colonies was based solely upon the terms of agreement and compact entered into by these separate and distinct bodies. The first union of this character was that formed by the 13 colonies in 1774, which was followed by the union of the States under the Articles of Confederation of 1777 (Maryland being the last State to ratify them, in 1781). On 4 July 1776, the colonies declared

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"that they are and of right ought to be *Free and Independent States*."—"that whenever any form of government becomes destructive of the ends for which it was established, it is the right of the people to alter or abolish it, and to institute a new government." In the Articles of Confederation the States, while agreeing to clothe the Congress with the powers of a common agent, expressly stipulated "that each State retains its sovereignty, freedom and independence and every power and right which is not, by this Confederation, expressly delegated to the United States in Congress assembled." Great Britain in Article I. of the Treaty of 3 Sept. 1783, "acknowledges the said United States, namely," (mentioning each of the 13 States), "to be *Free, Sovereign and Independent States*." The Confederation under the Articles of 1777 was succeeded by the Union under the Constitution adopted by the 12 States assembled in Constitutional Convention (Rhode Island holding aloof) and subsequently ratified by all the States. It is to be remembered that until North Carolina ratified the Constitution in November 1789, and Rhode Island ratified it in May 1790, these two States were considered as entirely independent commonwealths.

In the Constitutional Convention, and therefore until 1861, the Supreme Court of the United States and the highest courts of the several States, maintained in their decisions the principle of the unrelinquished sovereignty of each State, all holding that the central government had no right to exercise any powers, except such as were expressly delegated, or Congress to enact any laws except in pursuance of an express right granted by the States through the Constitution. This doctrine was formally enunciated in the tenth amendment to the Constitution: "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." The question of coercion of a State was raised in the Constitutional Convention and was quickly disposed of. When a proposition was made to empower Congress "to call forth the force of the Union against any member (meaning State) of the Union failing to fulfill its duty under the articles thereof"—Mr. Madison said that "a union of the States containing such an ingredient seemed to provide for its own destruction. The use of force against a State would look more like a declaration of war than an infliction of punishment and would probably be considered by the party attacked as a dissolution of all previous compacts by which it might be bound." He hoped "that such a system would be framed as might render this recourse unnecessary, and moved that the clause be postponed." Madison's motion prevailed unanimously. Every similar proposition was rejected. George Mason said of such a proposition: "Will not the citizens of the invaded State assist one another, until they rise as one man and shake off the Union altogether?" Oliver Ellsworth, in speaking to the Connecticut Convention said: "This Constitution does not attempt to coerce sovereign bodies, States, in their political capacity." Alexander Hamilton said in the New York Ratifying Convention: "To coerce the States is one of the maddest projects that was ever devised." Edmund Randolph, one of the most advanced of the Federalists, said that coercion was out of the

question. When the States ratified the Constitution they expressed in no uncertain terms their insistence that the States could not be coerced and could at any time withdraw from the confederation and retake the powers granted to the federal government. New York and Rhode Island said that: "the powers of government may be reassumed by the people whenever it shall become necessary to their happiness." Virginia in ratifying did "declare and make known that the powers granted under the Constitution being derived from the people of the United States, may be reassumed by them, whensoever the same shall be perverted to their injury or oppression, and that every power not granted thereby remains with them and at their will." The principle of the right of secession had always been sanctioned by the people of Massachusetts. When it was proposed to annex Louisiana to the Federal Union, the legislature of Massachusetts passed the following resolution: "That the annexation of Louisiana to the Union transcends the constitutional power of the government of the United States. It formed a new confederacy, to which the States united by the former compact *are not bound to adhere*." And in 1844, and again in 1845 the same legislature resolved: "That the project of the annexation of Texas, unless arrested on the threshold, *may drive* these States into a *dissolution of the Union*."

Alexander Hamilton was without question one of the most extreme advocates of a strong central national government, but even he expressed himself emphatically that any attempt on the part of Congress to enact a law which involved the exercise of power which was not granted by the Constitution would be an invasion of the power reserved to the States. He discussed this question in the 31st number of the *Federalist*, and concludes in these words: "Hence we perceive that the clause which declares the supremacy of the laws of the Union, like the one we have just considered, only declares a truth which flows immediately and necessarily from the institution of a Federal government. It will not, I presume, have escaped observation, that it expressly *confines this supremacy to the laws made pursuant to the Constitution*." At the time of the adoption of the Constitution, during the period of ratification and for many years thereafter this principle was not questioned. It was so thoroughly recognized that so long as any members of the Constitutional Convention remained members of Congress, and for a long period thereafter, that body confined its acts to expressly granted powers; and the messages of the Executive to Congress were only explanations of the condition and state of the Union—so very different from the messages since 1865 which are largely devoted to proposed policies of the administration, and exact from the President's party loyal obedience thereto.

In 1839 John Quincy Adams in his speech on the occasion of the 50th anniversary of our government under the Constitution said:

But the indissoluble union between the several States of this confederated nation is, after all, not in the right but in the heart. If the day should ever come (may Heaven avert it) when the affections of the people of these States shall be alienated from each other; when the fraternal spirit shall give way to cold indifference, or collision of interest shall fester into hatred, the bonds of political association will not long hold together parties no longer attracted by the magnetism of conciliated interests and kindly sym-

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thies; and far better will it be for the people of the disunited States to part in friendship from each other than to be held together by constraint. Then will be the time for reverting to the precedents which occurred at the formation and adoption of the Constitution to form again a more perfect Union by dissolving that which can no longer bind, and to leave the separated parts to be reunited by the law of political gravitation to the centre.

That Mr. Adams felt that these views were consistent with a true interpretation of the original compact which bound the people together is shown by the fact that three years later, 24 Jan. 1842, he presented to Congress a secession petition from citizens of Haverhill, Mass. In the 'Congressional Globe,' (Vol. II, p. 977) appears the following:

Monday, January 24.—In the House Mr. Adams presented the petition of sundry citizens of Haverhill, in the State of Massachusetts, praying that Congress will immediately adopt measures, peaceably to dissolve the Union of these States: First, because no union can be agreeable or permanent which does not present prospects of reciprocal benefits; second, because a vast proportion of the revenues of one section of the Union is annually drained to sustain the views and course of another section, without any adequate return; third, because, judging from the history of past nations, that Union, if persisted in in the present state of things, will certainly overwhelm the whole nation in destruction.

On the question of the reception of the petition, there were 40 votes in favor of it and 166 against. The following resolution was then introduced: "Resolved: That in presenting to the consideration of this House a petition for the dissolution of the Union, the member from Massachusetts (Mr. Adams) has justly incurred the censure of this House." Another resolution was introduced declaring that Mr. Adams had offered the deepest indignity to the House and an insult to the people of the United States. In defending his position Mr. Adams said:

I hold that it is no perjury, that it is no high treason, but the exercise of a sacred right to offer such a petition, and that it is as false in morals as it is inhuman to fasten that charge on men who, under the countenance of such declarations as I have here quoted, come and ask this House a redress of grievances. And if they do mistake their remedy this government should not turn them away and charge them with high treason and subornation of perjury; but ought to take it up, to weigh the considerations which can be urged in their favor; and if there be none but those which are so eloquently set forth in the pamphlet I have quoted, these should be considered. If they have mistaken their remedy, the House should do as the gentleman from Kentucky (Mr. Marshall) told us he was ready to do—admit the facts.

"The trial of Mr. Adams, to the exclusion of all other business, commenced on 25 January, and terminated on 7 February, when the whole proceedings were laid on the table without deciding a single question." This action of the House was construed by some as an admission that circumstances might arise which would justify States in withdrawing from the Union. Daniel Webster in his speech at Buffalo on 22 May 1851, denounced the anti-slavery agitators who were opposing the enforcement of the fugitive slave law, and demanded that they should observe the laws and the Constitution. And a little later, at Capon Springs, he said:

How absurd it is to suppose that when different parties enter into a compact for certain purposes, either can disregard any one provision, and expect, nevertheless, the other to observe the rest. . . . I have not hesitated to say, and I repeat, that if the northern States refuse wilfully and deliberately to carry into effect that part of the Constitution which respects the restoration of fugitive slaves, and Congress provide no remedy, the South would no longer be bound to

observe the compact. A bargain cannot be broken on one side and still bind on the other side. I say to you, gentlemen in Virginia, as I said on the shores of Lake Erie and in the city of Boston, as I may say again in that city or elsewhere in the North, that you of the South have as much right to receive your fugitive slaves as the North has to any of its rights and privileges of navigation and commerce. . . . I am as ready to fight and fall for the constitutional rights of Virginia as I am for those of Massachusetts.

Horace Greeley, the abolitionist, strongly insisted, in 1860, upon the right of the Southern States to secede, as the following extracts from the *Tribune* show.

New York *Tribune*, 9 Nov. 1860.—If the cotton States shall become satisfied that they can do better out of the Union than in it, we insist on letting them go in peace. The right to secede may be a revolutionary one, but it exists nevertheless.

And again in the same issue of his widely circulated and influential paper, Mr. Greeley said:

We must ever resist the asserted right of any State to remain in the Union and nullify or defy the laws thereof. To withdraw from the Union is quite another matter; and whenever a considerable section of our Union shall deliberately resolve to go out, we shall resist all coercive measures designed to keep it in.

New York *Tribune*, 16 Nov. 1860.—Still we say, in all earnestness and good faith, whenever a whole section of this republic, whether a half, a third, or only a fourth, shall truly desire and demand a separation from the residue, we shall earnestly favor such separation. If the fifteen slave States, or even the eight cotton States alone, shall quietly, decisively, say to the rest, "We prefer to be henceforth separated from you," we shall insist they be permitted to go in peace.

New York *Tribune*, 19 Nov. 1860.—Now we believe and maintain that the Union is to be preserved only so long as it is beneficial and satisfactory to all parties concerned. We do not believe that any man, any neighborhood, town, county, or even State may break up the Union in any transient gust of passion; we fully comprehend that secession is an extreme, an ultimate resort—not a constitutional but a revolutionary remedy. But we insist that this Union shall not be held together by force whenever it shall have ceased to cohere by the mutual attraction of its parts; and whenever the slave States or the cotton States only shall unitedly and coolly say to the rest, "We want to get out of the Union," we shall urge that their request be acceded to.

New York *Tribune*, 30 Nov. 1860.—Are We Going to Fight?—But if the cotton States generally unite with her in seceding, we insist that they cannot be prevented, and that the attempt must not be made.

New York *Tribune*, 24 Dec. 1860.—Most certainly we believe that governments are made for the people, not peoples for the governments; that the latter derive their just power from the consent of the governed; and whenever a portion of this Union, large enough to form an independent self-sustaining nation, shall show that, and say authentically to the residue, "We want to get away from you," I shall say, and we trust self-respect, if not regard for the principles of self-government, will constrain the residue of the American people to say, "Go."

New York *Tribune*, 28 Dec. 1860.— . . . Nor is it treason for the State to hate the Union and seek its disruption. A State, a whole section, may come to regard the Union as a blight upon its prosperity, an obstacle to its progress, and be fully justified in seeking its dissolution. And in spite of the adverse clamor, we insist that if ever a third or even a fourth of these States shall have deliberately concluded that the Union is injurious to them, and that their vital interests require their separation from it, they will have a perfect right to seek separation; and should they do so with reasonable patience and due regard for the rights and interests of those they leave behind, we shall feel bound to urge and insist that their wishes be gratified—their demand conceded.

During the time the States were seceding Mr. Greeley published many similar statements. Nor was the *Tribune* alone, for much of the New York press and prominent journals and able editors in many of the Northern States coincided in these views. "Wayward sisters, go in peace," was the cry on every hand, echoed from the lips

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of the general of the army, with the refrain uttered by the eminent Republican leader Salmon P. Chase: "The South is not worth fighting for; let them alone." The *New York Herald*, a journal which claimed to be independent of all party influences, said on 25 Nov. 1860: "Coercion in any event is out of the question. A Union held together by the bayonet would be nothing better than a military despotism." And the same paper said: "Each State is organized as a complete government, holding the purse and wielding the sword, possessing the right to break the tie of the confederation, and to repel coercion as a nation might repel invasion. . . . Coercion, if it were possible, is out of the question." The *New York Times* of 3 and 4 Dec. 1860, appealed to the people of the North to repeal the State laws preventing the return of fugitive slaves and by moderation and forbearance to prevent the threatened and almost inevitable dissolution of the Union. In March 1861, after Lincoln's inauguration, the *Commercial*, the leading Republican paper of Ohio, said:

We are not in favor of blockading the southern coast. We are not in favor of retaking by force the property of the United States now in possession of the seceders. We would recognize the existence of a government formed of all the slaveholding States and attempt to cultivate amicable relations with it.

In January 1861, after six States had seceded, James S. Thayer said, at a great meeting in New York:

We can at least, in an authoritative manner, arrive at the basis of a *peaceable separation*. . . . The public mind will bear the avowal, and let us make it,—that if a revolution of force is to begin, it shall be inaugurated at home. And if the incoming administration shall attempt to carry out the line of policy that has been foreshadowed, we announce that, when the hand of black Republicanism turns to blood-red, and seeks from the fragments of the Constitution to construct a scaffolding for coercion—another name for execution—we will reverse the order of the French Revolution, and save the blood of the people by making those who would inaugurate a reign of terror the first victims of a national guillotine!

These expressions were received with enthusiastic applause. At the same meeting ex-Governor Horatio Seymour asked whether "successful coercion by the North is less revolutionary than successful secession by the South?" At the same meeting ex-Chancellor Walworth said: "It would be brutal, in my opinion, to send men to butcher our own brothers of the Southern States as it would be to massacre them in the Northern States." Other distinguished speakers and editors throughout the North and West repeatedly expressed the same sentiments. Even Mr. Lincoln, when delivering his inaugural address on 4 March 1861, although arguing against the right to secede, did not openly enunciate the right of coercion, and while asserting his intention "to hold, occupy and possess the property and places belonging to the government, and collect the duties and imposts," said that "beyond what is necessary for these objects there will be no invasion, no using of force, against or among the people anywhere."

Course of Secession.—The Southern States having no hope of retaining or obtaining their rights under the Constitution except by a separation from the federal government, called conventions to decide upon what course to pursue, and ended by withdrawing from the Union. South Carolina took the lead, her Ordinance of

Secession being adopted 20 Dec. 1860. Six other States quickly followed her in the following order: Mississippi on 9 January, Florida on 10 January, Alabama on 11 January, Georgia on 18 January, Louisiana on 23 January, and Texas on 1 Feb. 1861. As one by one the Southern States fell into line asserting their right and determination to renounce the federal compact, the United States officials in these States, both military and civil, peacefully turned over their charge within the limits of each State to the authorities of the same, the only exceptions being the isolated fortifications of Fort Sumter and Fort Pickens. The machinery of government went on without delay, the same State officials performed their customary duties, and when the Provisional Government was established the only change was the substituting the authority and name of the Confederate States for those of the United States. On 21 Jan. 1861 Jefferson Davis, in his speech when relinquishing his seat in the United States Senate, said:

I rise, Mr. President, for the purpose of announcing to the Senate that I have satisfactory evidence that the State of Mississippi by a solemn ordinance of her people, in convention assembled, has declared her separation from the United States. . . . If it be the purpose of gentlemen they may make war against a State which has withdrawn from the Union; but there are no laws of the United States to be executed within the limits of a seceded State. A State, finding herself in the condition in which Mississippi has judged she is—in which her safety requires that she should provide for the maintenance of her rights out of the Union—surrenders all the benefits (and they are known to be many), deprives herself of the advantages (and they are known to be great), severs all the ties of affection (and they are close and enduring), which have bound her to the Union; and thus divesting herself of every benefit—taking upon herself every burden—she claims to be exempt from any power to execute the laws of the United States within her limits. . . . We recur to the principles upon which our government was founded; and when you deny them, and when you deny to us the right to withdraw from a government which, thus perverted, threatens to be destructive of our rights, we but tread in the path of our fathers when we proclaim our independence and take the hazard.

Here in the words of the man who was afterward the chosen chief of the reorganized federation, the reason for secession is given and the right of secession claimed. The senators from Florida and Alabama withdrew at the same time.

The Peace Congress.—On 19 Jan. 1861, the legislature of Virginia in extraordinary session, passed a resolution requesting all the States to send delegates to Washington to meet in convention on 4 February to confer upon some feasible and possible plan upon which to settle the difficulties between the sections. The body which is known in history as the Peace Congress sat in Washington from 4 to 27 February, but accomplished nothing. Five Northern States were not represented, and while there still existed a very conciliatory spirit in many parts of the North, it was unfortunate that many prominent men were bitterly opposed to the slightest concessions to the South. The speech of Judge Chase of Ohio, afterward Chief Justice of the United States, distinctly gave it to be understood that the Northern States would make no concessions. He said:

The result of the national canvass which recently terminated in the election of Mr. Lincoln, has been spoken of by some as the effect of a sudden impulse or of some irregular excitement of the popular mind; and it has been somewhat confidently asserted that upon reflection and consideration, the hastily formed opinions which brought about that election will be

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changed. . . . I cannot take this view of the result of the presidential election. I believe, and the belief amounts to absolute conviction, that the election must be regarded as a triumph of principles cherished in the hearts of the people of the free States. . . . We have elected him [Mr. Lincoln]. After many years of earnest advocacy and of severe trial we have achieved the triumph of that principle. By a fair and unquestioned majority we have secured that triumph. Do you think we, who represent this majority, will throw it away? Do you think the people will sustain us if we undertake to throw it away? I must speak to you plainly, gentlemen of the South. It is not in my heart to deceive you. I therefore tell you explicitly that if we of the North and West would consent to throw away all that has been gained in the recent triumph of our principles, the people would not sustain us, and so, the consent would avail you nothing.

The Congressional Globe, Vol. 31, Part 2, p. 1,247 (27 Feb. 1861) contains letters from Senators Bingham and Chandler to Governor Blair of Michigan. Senator Bingham wrote as follows:

Washington, 15 Feb. 1861.

Dear Sir:—When Virginia proposed a convention in Washington in reference to the disturbed condition of the country I regarded it as another effort to distract the public mind, and a step towards obtaining that concession which the imperious slave power so insolently demands. . . .

We have been assured by friends upon whom we can rely that if those two States, Michigan and Wisconsin, should send delegations of true, unflinching men, there would probably be a majority in favor of the Constitution as it is, who would frown down rebellion by enforcement of laws. . . . It cannot be doubted that the recommendations of the convention will have a considerable influence upon the public mind, and upon the action of Congress. . . .

I hope I shall be pardoned for suggesting that it may be justifiable and proper, by any honorable means, to avert the lasting disgrace which will attach to a free people who, by the peaceful exercise of the ballot, have just released themselves from the tyranny of slavery, if they should now succumb to treasonable threats, and again submit to degrading thralldom. . . .

K. S. Bingham.

To His Excellency, Governor Blair.

Senator Zach Chandler wrote:

Washington, 11 Feb. 1861.

My dear Governor:—Governor Bingham and myself telegraphed you on Saturday, at the request of Massachusetts and New York, to send delegates to the Peace or Compromise Congress. They admit that we were right, and that they were wrong; that no Republican State should have sent delegates; but they are here and they cannot get away; Ohio, Indiana, and Rhode Island are caving in, and there is danger of Illinois; and now they beg us, for God's sake, to come to their rescue, and save the Republican party from rupture. I hope you will send *stiff-backed* men, or none. The whole thing was gotten up against my judgment and advice, and will end in thin smoke. Still, I hope, as a matter of courtesy to some of our erring brethren, that you will send the delegates.

Truly your friend,

Z. Chandler.

His Excellency, Austin Blair.

P. S.—Some of the manufacturing States think that a fight would be awful. Without a little *blood-letting*, this Union will not, in my estimation, be worth a rush.

These letters were promptly published in the Detroit *Free Press* and also in the 'Congressional Globe.' Senator Powell commenting, in the Senate, upon the letters, said: 'I think it evident from these letters that there is and has been a fixed purpose in certain quarters, that the peace conference should do nothing. It is very evident that these "stiff-backed" gentlemen were to be sent in order to prevent any compromise being presented.' Senator Chandler said: 'It is a question in which the people of Michigan take a great interest. They are opposed to all compromises; they do not believe that any compromise is necessary, nor do I. They are prepared to stand by the Constitution

of the United States as it is; ay, sir, to stand by it to blood, if necessary.' A majority of the convention or congress was sufficiently moderate to recommend a measure to Congress which would, without doubt, have preserved peace and union, but when presented to the United States Congress it was met with cool indifference, objection was made to its consideration, and upon a vote it was rejected.

The failure of the Peace Congress and the finally expressed determination of the government to make no concessions and to exercise the forces of the government in coercion forced Virginia and the other so-called border States from their conservative position. Arkansas adopted an Ordinance of Secession on 15 April, and Virginia on 17 April. In the latter State the Ordinance was to be made subject to the ratification of the people late in May, but the action of the Federal government in preparing for war and the proclamation of President Lincoln calling for troops, hastened her union with her sister States of the South. Tennessee passed an Ordinance of Secession on 6 May, which was ratified by the people on 8 June, and North Carolina seceded on 20 May. Such a division of sentiment existed in Kentucky and Missouri that while they did not secede they were given representation in the Confederate Congress.

Formation of the Confederate Government.—

In the meantime the several conventions of the first seven seceded States appointed deputies to a congress, naming Montgomery, Alabama, as the place, and 4 February as the time of meeting. This assembly formed a new federation under the name of the Confederate States of America, elected Jefferson Davis of Mississippi, President, and Alexander H. Stephens of Georgia, Vice-President, and drew up a Constitution establishing a Provisional Government, and on 11 March adopted the permanent Constitution of the Confederate States. Alexander Stephens, who knew his people, had distinctly declared that 'the tendency of the large majority of Georgia is to conservatism,' and this was true as well of all the other States. It was Mr. Lincoln's proclamation of 15 April that destroyed the last remaining vestige of the hope entertained by the conservatives that a return to the principles of the Constitution by the people of the North and the Federal Government, might bring about a re-construction of the Union, a hope to which their hearts still clung tenaciously. Had not two States held aloof from the compact of 1787 to return in 1789 and 1790? Why might not history repeat itself? they thought and argued. The seat of government of the Confederacy was removed to Richmond, Va., and the Provisional Congress met there on 20 July 1861. At this session delegates from Virginia, North Carolina and Tennessee were added to the body. The Second Congress met on 22 Feb. 1862, with full representation from Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, South Carolina, Tennessee, Texas, and Virginia. In the Second Congress which convened on 22 Feb. 1862, the 13 States above named were represented and delegates were present from Arizona and from the Cherokee, Choctaw, Creek and Seminole Nations.

Secession of West Virginia.—As above noted

SECESSION CHURCH—SECESSIONISTS

the Virginia Convention passed an ordinance of secession on 17 April 1861, which was submitted to the people and adopted by them. There was a majority against it in the northwestern part of the State. In June 1861, a convention of the Unionist counties was held in Wheeling. This convention adopted an ordinance for a reorganization of the State government, and in August adopted an ordinance providing for the formation of a new State. Most of the citizens being in the field as soldiers on one side or the other, a very small vote was polled, but a majority was for the formation of a new State. In May of 1862 the "reorganized government" of this part of Virginia passed a bill authorizing the formation of a new State. On 31 Dec. 1862, the Congress of the United States passed an act admitting the State of West Virginia into the Union, the law having the following preamble:

Whereas, the people inhabiting that portion of Virginia known as West Virginia did, by a convention assembled in the city of Wheeling on the twenty-sixth of November, eighteen hundred and sixty-one, frame for themselves a Constitution with a view of becoming a separate and independent State; and whereas at a general election held in the counties composing the territory aforesaid on the third day of May last, the said Constitution was approved and adopted by the qualified voters of the proposed State; and whereas the legislature of Virginia, by an act passed on the thirteenth day of May, eighteen hundred and sixty-two, did give its consent to the formation of a new State within the jurisdiction of the said State of Virginia, to be known by the name of West Virginia, and to embrace the following named counties; and whereas both the convention and the legislature aforesaid have requested that the new State should be admitted into the Union, and the Constitution aforesaid being republican in form, Congress doth hereby consent that the said forty-eight counties may be formed into a separate and independent State.

The End of Secession.—Although the Supreme Court of the United States several times decided that the seceded States were never legally out of the Union, yet for four years the secession of 11 States was an accomplished fact, and for four years the Confederate States of America was a *de facto* government, exercising, through its executive, legislative and judicial departments, all the powers and functions of a federal government within the territory of the States which comprised it, under a constitution modeled upon the Constitution of the United States, and adopted and ratified by the people of its States. In the States themselves there was no change nor interruption in any of the affairs of government except in the places which were occupied by the federal armies. But by force of arms the Confederate government was overthrown and each of the seceded States, after a period of reconstruction, came back and took its place in the Union under the old Constitution as amended by the victorious party in the great conflict. See also UNITED STATES—CAUSES OF THE CIVIL WAR; UNITED STATES—SECESSION.

BRIG.-GEN. JOSEPH WHEELER,

Author of 'Military History of Alabama.'

Secession Church, in Scotch ecclesiastical history, a religious body which withdrew from the Established Church of Scotland in 1733, when several preachers were ejected in consequence of their opposition to the law of patronage. The ejected ministers formed themselves into an ecclesiastical court, under the name of the "Associated Presbytery," and published an act, declaration, and testimony to the doctrine, worship, government and discipline of the

Church of Scotland. In 1747 a division arose among the seceders respecting the legality of the burgh oath, in which burghesses profess "the true religion professed within the realm." Those who asserted the lawfulness of the oath were called burghers, those who condemned it antiburghers. In 1820 they were reunited as "The Associated Synod of the Secession Church," several congregations of each party, however, refusing to accede to it. In 1847 the Associated Synod joining with the Relief, constituted the United Presbyterian Church. See PRESBYTERIAN CHURCH; PRESBYTERIANISM; SCOTLAND.

Secession of the Plebs. The abolition of the old Roman monarchy about the year 500 B.C. raised the patricians to such power that they became absolute lords and masters of the commonwealth. The fact that the patricians were in possession of the republican offices and exclusively represented in the senate excited the spirited opposition of the plebs as a class. Together with their political grievances, the plebs were greatly oppressed by the patricians; their lands were laid waste; they became involved in debt by the excessive war taxes; the laws were administered with reckless severity; until at last the poor wretches were compelled to resist. They refused military service. The dictator, M. Valerius, to pacify them and get recruits for the army, promised protection from their creditors and the abolition of debts, and he succeeded in organizing 10 legions and marched against the Volcians, Æquians, and Sabines. Upon their return from these campaigns they were disbanded, but still kept under military surveillance lest they should enforce the fulfilment of the promise. In 494 B.C. this brought about the secession of one of the armies, who marched to the so-called Sacred Hill, on the right bank of the river Anio, encamped there and threatened to secede altogether. The patricians negotiated and yielded to their demands that two plebeian magistrates, called Tribunes of the Plebs, should be chosen, who should protect the plebs from the unfair treatment of the patrician magistrates. There is nothing authentic to show how many tribunes were chosen, the number varying from two to five, but as there were only two consuls at the time, the number of tribunes probably corresponded. This tribunate, however, was not of long duration and was abolished, the decemvirate, composed of five patricians and five plebeians, being substituted in its place. These decemvirs began to rule like kings, their caprice being their only law, and when their terms of office expired, in 449 B.C., refused to abdicate. This caused a second secession of the plebs, who refused to return until the old constitution and tribunate were restored, which was later done. The decemvirs were banished and all their property confiscated. Consult Wilhelm Ihne, 'History of Rome,' Vol. I., chap. ii.-ix. (London 1871).

Secessionists, the members of an artistic association in Germany similar to that formed in the Société des Beaux Arts at Paris. The Secessionists were artists who revolted against the strictly academic and traditional spirit in which selections and awards were made by the jury which decided the hanging of pictures in the Academy of Art and distributed the medals

SECESSIONVILLE

and other awards voted to their merits. In 1892 Piglhein (q.v.), F. von Uhde (q.v.), Dill, A. Keller, Stück, and others founded a new school of naturalism, and this movement in German art was greeted with the same howl of derision as that with which the Pre-Raphaelites in England had been met. The movement gained ground especially in Munich, the headquarters of a strong conservative and academic coterie. The new spirit here burst into actual revolt; and the members of the "Munich Secession" actually built a new exhibition building for themselves. Their work, however, won public recognition, and the heaven of their example did its work in vivifying German art. As a result the schism came to an end and the new building was eventually abandoned, while the secessionists at this moment scarcely exist excepting in name, like the Pre-Raphaelites (q.v.) and the Nazarenes (q.v.). Consult: Bierbaum, 'Fritz von Uhde'; De la Mazelière, 'La Peinture Allemande au XIXe Siècle' (1900).

Secessionville, sê-sêsh'ôn-vil, Battle of. In May 1862, Gen. D. Hunter, commanding the Department of the South, began preparations for throwing troops upon James Island to make a quick advance upon Charleston, S. C. On 2 June the advance of Gen. I. I. Stevens was landed on the southwest part of the island, and next day made a reconnaissance in force to within a short distance of a battery at Secessionville, about two miles from Stone River, with water on three sides. It was on a narrow causeway bordered by swamps, and approachable by land only from the west. The gunboats co-operated in the movement, which was but partially successful, the Confederates, under Lieut-Col. Ellison Capers, 24th South Carolina, defending the position, and inflicting upon Stevens a loss of 17 killed and wounded, and taking 22 prisoners. The effect was increased watchfulness on the part of the Confederates, the strengthening of the forces on James Island, and the stoppage at Charleston of troops that had been ordered to Richmond to resist McClellan. On the 8th Stevens made another reconnaissance, came under artillery fire, and withdrew with a loss of seven killed and wounded. On the same day Gen. Wright's division arrived from Edisto Island, and next day marched to near Grimbail's Landing, two or three miles to the left of Stevens, who was covering the position opposite Legareville, on John's Island. It was determined to carry the battery by a rush, and thus open the way to Charleston, but 10 miles distant; and orders were given for an assault to be made at dawn of 11 June, but Col. T. G. Lamar, now in command of the Confederate works at Secessionville, assumed the offensive, and toward evening of the 10th attacked Wright's pickets and advance posts with infantry and artillery, and was repulsed, suffering severe loss, and inflicting upon Wright a loss of about 25 killed and wounded. This caused a postponement of the assault and the beginning of the construction of a battery to silence the Confederate guns. Gen. Hunter, disappointed in his expectation of carrying Charleston with a rush, returned to Hilton Head on the 11th, leaving orders with Gen. Benham, next in command, to make no attempt to advance on Charleston or on Fort Johnson until largely reinforced, but to provide, however, for "a secure intrenched encampment." At the end of five days the battery

had been constructed, but it failed to silence the Confederate guns, and Benham, as Hunter says, "disobeyed positive orders and clear instructions" and, against the emphatic protest of his two division commanders, proceeded to assault the work. He had for the purpose 3,100 men under Gen. Wright, and 3,500 under Gen. Stevens. The work to be assaulted had an earthen parapet seven to eight feet high, outside of which was a ditch seven feet deep, and in front of which was a strong abatis. A line of rifle-pits extended on both flanks and in the rear, sweeping the open interior of the work. Its armament was six heavy guns—8-inch columbiads and rifled 24 and 18 pounders. It was defended by about 1,000 men, and there were supports near that came up at the close of the action. Stevens, with his 3,500 men, was to make the assault, and Wright, moving from Grimbail's Landing, was to co-operate by moving on his left and rear. Stevens had two brigades, Col. Fenton's (8th Michigan, 7th Connecticut, 28th Massachusetts) and Col. Leasure's (46th and 79th New York and 100th Pennsylvania), and four guns. At 3.30 A.M. the troops were assembled beyond the camps and at 4 A.M. when it was so dark that one man could not follow another except at short intervals, the column moved forward, Fenton leading, with a storming party of two companies of the 8th Michigan, closely followed by the other eight companies of the regiment, the 7th Connecticut, and the 28th Massachusetts. Leasure followed Fenton. The advance moved quietly and, when within 800 yards of the work, surprised and captured a small picket-guard without firing a shot, and orders were given to accomplish the allotted task with the bayonet only. Lamar had knowledge of the movement and had sent for reinforcements, and was standing by his heavy guns, which had been charged with canister, as the leading regiment came within 300 yards and deployed into line; then his guns opened their canister-fire, and at the same time heavy volleys of musketry from dikes and hedges were poured upon the right flank of the assaulting column. The Union regiments closed up rapidly and made a rush for the work, shooting down the gunners; all the regiments got close to the work, and men of each went through the abatis; men of the 8th Michigan and 79th New York gained the ditch and scaled the parapet. "Some of them," says Beauregard, "in the impetus of the assault went even inside one of the salients of the works"; but it was of no avail; the mingled Union troops could not be handled, and at 5 o'clock, after a severe contest of 25 minutes, they fell back 500 yards to a hedge, under cover of artillery, with a loss of over 500. Wright had participated in the movement by checking a reinforcement on its way to the work, but did not become seriously engaged, although losing some men. At 9 o'clock Benham ordered Stevens back to camp. The Union loss was 107 killed, 487 wounded, and 89 missing, an aggregate of 683. The Confederates report a loss of 52 killed, 144 wounded, and 8 missing. The result of the battle was fatal to the plan of an immediate advance on Charleston, and late in June the Union troops were ordered to withdraw from James Island, and for some time to come no further attempt was made to capture the city. Consult 'Official Records,' Vol. XIV.

E. A. CARMAN.

SECHIUM—SECOND SIGHT

Sechium, a genus of the gourd family (*Cucurbitaceae*) with one species (*S. edule*). This is a perennial, rough-stemmed, climbing vine native to the West Indies and the neighboring mainland, sometimes cultivated for covering arbors, since it makes a rapid and sturdy growth, but chiefly for the valuable food afforded by its roots and fruits. It has large, thin, heart-shaped leaves five-angled like those of the cucumber; branched tendrils opposite the leaves, and yellowish, monœcious flowers, the pistillate solitary or paired in the axils, the staminate in a raceme. These flowers have rotate calices and five-parted corollas and a one-celled ovary with six-lobed stigma, which matures into a pear-shaped fruit, some six inches long. It has an irregularly ribbed or furrowed surface slightly spiny, but shining, and in color ranging from pale green to creamy tints; the interior is fleshy and white, and contains a large flat seed, which germinates within the pericarp, often before it falls from the vine, so that the whole fruit is planted. This fruit is edible, as is also the very large, corky, and starchy root-tuber, sometimes weighing 20 pounds, and both are cooked as vegetables having somewhat the flavor of turnips. The sechium fruit is called vegetable pear in the British colonies, and has local names such as chayote or pepinella.

Seckendorf, Friedrich Heinrich, frēd'rih hin'rīh zēk'ēn-dōrf, COUNT VON, Franconian soldier and diplomat: b. Königsberg 5 July 1763; d. Meuselwitz, Germany, 23 Nov. 1763. He served in the war against the Turks on the Danube, and in that of the Spanish Succession, greatly distinguished himself at Blenheim in 1704 and was present as an ambassador at the conclusion of the Peace of Utrecht. He also served in the war against Sweden, 1715, and against the Spaniards in Sicily, 1720. In 1726 he was ambassador to Berlin and gained over Frederick William I., to acknowledgment of the pragmatic sanction and an alliance with Austria. Seckendorf next served in the war of the Polish Succession, gaining the victory of Klausen. During the Turkish war he was made field-marshal in 1737, and commander-in-chief. He was unsuccessful, however, and was recalled and imprisoned in the fortress of Grätz. Receiving no appointment when he was released he entered the service of Charles VII. of Germany against Maria Theresa. He cleared Bavaria of Austrian troops, but on the emperor's death in 1745, peace was established and Seckendorf was restored to his Austrian honors. He retired to his castle at Meuselwitz, but in 1788 was imprisoned by Frederick II. of Prussia, on a charge of treason, and was released after six months upon the payment of 10,000 thalers.

Seckendorf, Gustav Anton von, BARON ("PATRICK PEALE"), German dramatist and novelist: b. near Altenburg, Germany, 26 Nov. 1775; d. Alexandria, La., 1823. He was educated at Leipsic and Wittenberg, became well known as a writer and lecturer, and died while on a lecturing tour in the United States, where he was known as "Patrick Peale." His works include: 'Otto III., der gutgeartete Jüngling' (1805); 'Kritik der Kunst' (1812); 'Beiträge zur Philosophie des Herzens' (1814); 'Des Vaters Bild' (1822); etc.

Sec'ker, Thomas, English prelate: b. Sibthorpe, Nottinghamshire, 1693; d. Canterbury, England, 3 Aug. 1768. He studied medicine at London and at Paris, and took his degree at Leyden in 1721, after which he decided to enter the ministry. He was graduated from Oxford in 1722, and in the following year was ordained a priest. His first living was at Houghton-le-Spring in 1724, and in 1727 became rector of Ryton and prebendary of Durham. He was appointed chaplain to the king in 1732, became rector of Saint James', London, in 1733, bishop of Bristol in 1735, of Oxford in 1737, dean of Saint Paul's in 1750, and archbishop of Canterbury in 1758. He was a wise, large-hearted, and hard-working bishop, and an able though not a brilliant preacher.

Second, a division of time, the 60th part of a minute of time or of a minute of a degree. The hour and degree are each divided into 60 minutes (marked thus, 60'), and each minute is subdivided into 60 seconds (marked thus, 60").

In music, the interval of a second is the difference between any sound and the next nearest sound above or below it. There are three kinds—the minor second or semitone, the major second, and the extreme sharp second. Also a lower part added to a melody when arranged for two voices or instruments.

Second Advent of Christ. See MILLENNIUM.

Second Adventists. See ADVENTISTS.

Second Sight, an extraordinary power of vision, mental or physical, real or imaginary, believed to be possessed by certain individuals. This belief, by many held to be superstitious, but by not a few regarded as having a basis in the natural laws of mental and sensuous perception, once prevailed throughout the Scotch Highlands and the Hebrides, where it has now almost wholly disappeared with the belief in the Brownie or in the Greonach, the "Old Long-beard," and with the general use of charms and incantations, though, like that superstition, it still lingers in retired nooks of the Highlands and of the Western Isles. Second sight, called by the Scotch Gael *taish* (Irish Gaelic *taise*, fetch, spectre), is recognized by many eminent students of psychic phenomena as a faculty possessed by many persons whereby they have vision (or other sense-perception) of persons and occurrences at distances far transcending the reach of normal vision or hearing. Dr. Samuel Johnson's definition of second sight and his illustrations of its phenomena are exact and without prejudice; he left the Western Isles deeply impressed with a philosophic curiosity regarding this mysterious faculty, not believing but only "willing to believe"; he could not "advance his curiosity to conviction." "The second sight," he writes, "is an impression made either by the mind upon the eye, or by the eye upon the mind, by which things distant or future are perceived, and seen as if they were present. A man on a journey far from home falls from his horse, another, who is, perhaps at work about the house, sees him bleeding on the ground, commonly with a landscape of the place where the accident befalls him. Another seer, driving home his cattle, or wandering in idleness . . . is suddenly surprised by the appearance of a bridal ceremony, or funeral procession, and counts the mourners or attendants,

SECONDARY ROCKS—SECRET SERVICE

of-whom, if he knows them, he relates the name, if he knows them not, he can describe the dresses." It is seen that though *taish* means spectre, ghost, it means also phantasmal appearances of living persons and material objects—"phantasms of the living," as second sight of persons at a distance is called in the publications of the Society for Psychical Research. Dr. Johnson's reply to the objections of those who held the belief in the second sight to be purely a delusion was that the thing is wonderful only because it is rare; considered in itself, he says "it involves no more difficulty than dreams, or perhaps than the regular exercise of the cognitive faculty." Particular instances have been given, with such evidence, as "neither Bacon nor Bayle has been able to resist"; and the second sight of the Hebrides "implies only the local frequency of a power which is nowhere totally unknown." ('Journey to the Hebrides,' Philadelphia, 1810, 184 *sqq.*) Walter Scott's opinion of the reality of second sight was that "if force of evidence could authorize us to believe facts inconsistent with the general laws of nature"—as ascertained by him—"enough might be produced in favor of the existence of the second sight." Modern psychology has less fear of the overturning of the laws of nature by the admission of the power of second sight. The finally decisive word of psychological science upon the reality of this alleged faculty has not yet been pronounced.

Secondary Rocks. (a) Rocks formed during the secondary or Mesozoic age of the earth. In this sense the term is rarely used now. (b) Rocks resulting from the alteration of other or primary rocks; among these are gneisses, schists, greenstones and rocks generally formed through metamorphosis, whether static, dynamic or thermic. Clastic rocks, being derived from originally deposited rocks, are also secondary, as are also in the strictest sense all non-clastic rocks which have resulted from the fusion and re-cooling or solution and re-precipitation of older rocks, that is, stalactites, silicious or calcareous tufts, etc. See SEDIMENTARY ROCKS.

Secret Service, United States, a department or bureau of the Treasury Department, organized in 1864, and having 28 secret service districts throughout the country. The bureau is not created by law, nor recognized by Congress by special expense appropriations. While its duties are not definitely defined, the work of the bureau is largely the detection of counterfeiters, moonshiners, smugglers and other criminals who may attempt to defraud the United States Treasury. During the Civil War the bureau was by necessity made an important branch of government service, the chief being a military officer with the rank of brigadier-general of volunteers. The assassination of President Lincoln brought about a more careful guarding of the person of the chief executive, and since 1865, secret service officers have invariably accompanied the President upon his journeys and during his absence from the White House. While certain trained secret service officers are detailed for this work, others are stationed in foreign countries, and a number of so-called revenue officers are constantly engaged in Kentucky, Indiana, Tennessee and other States, detecting the illicit distilling of liquor, and bringing moonshiners to justice.

Counterfeiters.—The bulk of the work of the

bureau, however, is the detection and punishment of counterfeiters. John E. Willkie, chief of the service, in a statement made 29 July 1899, said: "Certainty of swift detection should perhaps prevent counterfeiting, but so long as there is a gambler's chance of escape, there will be found those who feel sure they can succeed where others have failed. Hence the necessity for the secret service branch of the government. And as the making of spurious money is a fascinating enterprise for a cunning rogue, so the checkmating of that same rascal in the countless schemes devised to yield an illegitimate fortune is a game of absorbing interest to him who plays it. The liberty of one, perhaps the life of one or the other, are the stakes in this battle royal. The advantage lies first with the law-breaker. He plans and works in secret for months and sometimes years; then stealthily, through trusted channels, the product of his labor is marketed and bad money is quickly turned into good. But work as he may, some imperfection in his spurious bills which has escaped him one day arrests the glance of the keen-eyed money handler. Familiarity with the characteristics of genuine money results in the involuntary detection of a counterfeit. No two cases are ever exactly alike, for the counterfeiter is a fertile fellow, and is a constant student and inventor of precautionary measures that he feels certain will insure his safety." In the investigations made by the division, the chief has constantly before him the exhaustive daily reports of each man in the service, and a careful weighing of the various points submitted by operatives working often at widely separated localities will frequently suggest a move in the right direction. The gravity of the crime make progress slow, for no step is taken till facts are established to warrant it. It is always considered desirable to so arrange the final act in this drama that the criminal may be taken wholly by surprise. There is a sort of momentary paralysis following the shock of sudden disaster, and when a raid is properly planned the chances of serious resistance are minimized. Occasionally it happens that it becomes necessary for a deal to be made directly with the handlers of spurious money, and in these cases it takes a man of nerve and keen wit to bring it to a successful issue. Such transactions are always fraught with great personal danger.

Informers.—There is small encouragement for the private citizen to aid the government in the arrest of counterfeiters as the following circular will show:

U. S. TREASURY DEPARTMENT,
SECRET-SERVICE DIVISION,
Washington, D. C.

The general principles governing the action of this division in presenting small gratuities of money as an expression of its thanks to persons who perform meritorious service in bringing counterfeiters to justice are:

1st. Expenses incurred or services rendered in detecting crime against the United States, when unauthorized by this division, are not reimbursed or compensated by it.

2nd. As all United States officers are expected to aid in the suppression of crime against the United States when their attention is directed to any specific violation of law, this class is excluded from receiving the gratuities awarded by this division.

3rd. All persons not of the foregoing class, who arrest and procure the conviction and sentence of a counterfeiter, or whose evidence is regarded by the prosecuting attorney as having been more material in the case than that of any other witness, upon application, in writing to the office of the Chief at Washington, D. C. (accompanied by a certificate from the prosecuting officer, which certificate should set forth the docket-record of the case, and state that the applicant is the

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meritorious person through whose agency a conviction of the counterfeiter was procured), will, if approved by the Assistant Secretary of the Treasury, receive a gratuity, the amount to be graded by various considerations—such as, the ability for mischief, and the antecedents of the person arrested and convicted; the length of the term of imprisonment for which he is sentenced; the quantity and character of counterfeit money and counterfeiting material captured with or through him.

No application for a gratuity in any case will be considered until all the counterfeit money and counterfeiting material connected with the case have been expressed to this office. (Express charges C. O. D.)

There are no blanks for use of such applicants. Persons in making application should state fully the service rendered for which a gratuity is asked.

In order to avoid errors and trouble, it should be the practice of all informers to put themselves in communication with operatives of this division, advising them of every movement. As a matter of protection in their rights, this course is indispensable, for an operative is bound to communicate daily to the office of the Chief all information he gains, so that his records, and those at headquarters, stand for the justification of the informer whenever he avails himself of their facilities.

In the absence of an agent of this division, informers should confer with United States Attorneys, Marshals, Commissioners, Collectors of Customs or of Internal Revenue, who will gladly advise with them on such matters.

This circular is not intended to give the holder any authority to act for the Secret Service Division of the United States Treasury Department. CHIEF.

Statistics.—The report of the Chief of the Secret Service to the Secretary of the Treasury for the fiscal year ending 30 June 1910 shows that 316 arrests were made during the year. Of this number 185 were of persons manufacturing, passing or having in their possession counterfeit silver coin; altering obligations of the United States, 58; manufacturing or passing counterfeit paper money, 51.

Of the 316 persons arrested 117 were convicted, 63 were awaiting the action of the court, 71 were awaiting the action of the United States grand jury, 29 were acquitted, 10 were ignored by the United States grand jury, 1 was nolle.

In 1903 the secret service captured counterfeit paper money valued at \$490,766 and counterfeit coins to the value of \$16,185. The following table presents a comparative statement of the business transacted by the secret service since 1894:

YEAR	No. of arrests	Value of counterfeit notes captured	Value of counterfeit coins	No. of plates	No. of dies	No. of molds
1894.....	687	\$13,942	\$10,756	134	14	156½
1895.....	803	27,428	7,092	935	19	217½
1896.....	780	757,531	10,678	339	47	228
					50	1
1897.....	842	438,866	13,980	187	21	353
					3	
1898.....	705	117,243	10,021	514	14½	235½
1899.....	679	55,689	20,778	267	22	413½
1900.....	654	33,863	21,195	209	26½	309
1901.....	594	40,056	18,116	283	45	271½
1902.....	573	46,004	19,828	164	73½	168½
1903.....	424	16,211	15,479	76	43½	412
1904.....	419	44,350.40	16,419.75	67	93½	154
1905.....	532	36,834.20	24,110.50	99	97	357½
1906.....	356	18,768.10	19,520.46	43	8	126½
1907.....	216	16,036.75	11,619.36	36	26	155½
1908.....	345	47,849.75	19,135.33	57	34	232½
1909.....	400	44,831.05	22,260.37	95	54	308
1910.....	316	499,795.55	16,185.34	49	30	202

There is to-day, as part of the Federal Government, a new Secret Service, which is larger and more powerful because of the greater latitude it is given in its work. Its duties take its agents to all points of the world. It is authorized to act for every branch of the government, and to handle all manner of cases of violation

of the Federal statutes. It has come into being only in the last two years, yet it employs more secret agents, spends more money, performs a greater variety of service, than has any other such body of men. It is under the Department of Justice, and its province is to gather evidence in all manner of cases that this department represents before the courts. Anti-trust prosecutions, violations of the national banking laws, land graft, bucket shop frauds, night riding, smuggling, peonage, white slavery, and a hundred other counts come under its jurisdiction. In the work of all the departments it takes hold where investigations point to crime. There are investigating bureaus in most of the departments. These amass facts and figures but no evidence. The province of the new Secret Service is to procure evidence admissible in court in any case where the Government may appear as the prosecutor. The force, of which S. W. Finch is chief, numbers nearly 200 men. For the maintenance of this force Congress last year appropriated \$485,000 for the "protection, prevention, and prosecution of crime."

In the Philippines.—In the Philippine Islands there are 25 employees of the Secret Service Bureau under charge of the chief, Charles R. Trowbridge, since the organization on 7 Aug. 1901 of the Manila district. The members of the bureau have been selected slowly and with great care, and have been subjected to hard and difficult schooling. Previous to August 1901 the department was under the jurisdiction of the military authorities, when the duties performed consisted of general secret service work incidental to the military occupation of a foreign country, namely, to detect and frustrate plots against the government, locating and arresting insurgent leaders, and the capturing of insurgent records and munitions of war, as well as performing all the criminal work necessary. At this time, the country being under martial law, arrests were made under that authority, without the application of civil process, simplifying

to a great extent the duties of the secret service agents as compared with the present. As the insurgent army disbanded, great numbers of its officers and soldiers came to Manila, and as they had done nothing but soldier for many years, they were not disposed to settle down immediately to peaceful vocations, and were will-

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ing to engage in any pursuit that did not demand any mental or physical exertion. The individual work of the secret service agents of the Manila department should not be compared with that performed by similar officials in the States. The cosmopolitan population of the city, the many languages spoken, the necessity of being conversant with these languages, the intensely secretive nature inherent in the Oriental, and their fear of revenge for testimony and information given, consequent to generations of Spanish domination, render the task of handling native criminals arduous in the extreme. This, taken together with the large and increasing number of adventurers, Americans and Europeans, constantly arriving in the islands, who expect to be able to make a living without working for it, taxes the energies of the force to the utmost. Since its creation under the civil government this department has apprehended and brought to justice the authors of every murder committed within its jurisdiction with the exception of two who escaped to the provinces. The Oriental possesses a peculiar aptitude for counterfeiting, and cases of this nature are constantly under investigation. During the early days of American occupation, and while the Bilibid prison was still in charge of the Spanish authorities, great numbers of prisoners of the worst class effected their escape, and although the secret service office is continually locating them and returning them to the prison, the majority of them are still at large. The total expenses of the bureau approximate \$2,000 United States currency per month, and the amount of lost and stolen money recovered in the same time often exceeds that amount. The Manila office maintains a correspondence with the other large cities of the Orient and the United States with reference to criminal information. There are on file about 3,000 photographs of convicted criminals of all classes and nationalities, together with a complete description of the same, and the records contain information pertinent to every political and criminal case which has ever come under the supervision of the secret service.

WILL M. CLEMENS,

Editorial Staff, 'Encyclopedia Americana.'

Secret Societies have existed in all ages known to history, and among all classes of mankind, except, perhaps, savages of the very lowest type. In the ancient world they were chiefly religious, or at least professedly so, but in ancient times religious and temporal power were so closely associated that it was difficult, if not impossible, to draw a dividing line. There were the mysteries of Osiris and Serapis in Egypt, of Orpheus and Dionysus in Greece, of Cybele in Phrygia, and of Mithras in Persia, all of which tended to surround the worship of the gods with elements of secrecy and awe, which appealed to the conscience and imagination of men, and helped to keep the ignorant multitude in submission to the hierarchy and all that it represented. The tendency of ancient religions, in all countries, was toward secrecy and mysticism, and it was not easy to obtain admission to the inner circle of the elect. Once admitted, however, as a participant in the mysterious rites, the initiate became one of a fraternity whose influence was felt in every walk of life, and whose power even the most despotic tyrant did not care to defy. Among Jews as well as

Gentiles secret societies held potent sway. The Essenes were a religious sect, devoted sincerely to the purer life which the Pharisees, with less sincerity, professed, and their asceticism was attended by a large degree of mysticism. The Cabalists were successors of the Essenes, and also had their mystic practices and secret signs, and the Christian Gnostics were an exclusive sect with occult ceremonies and teaching.

In the Middle Ages the secret courts of Westphalia were practically vigilance committees bound to secrecy by the very object of their existence. The Knights Templars were a secret order, although there is no trustworthy evidence that they were guilty of the practices alleged against them as a ground for the suppression of the order, and the seizure of its wealth.

The Freemasons originated in the combinations formed by operative masons in the Middle Ages for self-protection while they were building the cathedrals and other great structures which excite the admiration of the modern world. Speculative Freemasonry, as it is called, was based on the more ancient form, and found in it a useful groundwork for the vast organization which has spread over the globe, and has its members in every class, from emperor and king to the toiler who works for his daily bread.

The secret societies which have arisen within the 19th century have been chiefly political and benevolent. The struggle for freedom in Italy gave birth to powerful secret organizations, which continued to exist after Italian unity had been gained, and have caused, at times, much anxiety to the authorities. Ireland has also had and still has a number of secret political societies, including the United Irishmen, the Fenians, the Orangemen, and other orders of the past and present. In Russia the revolutionary society known as Nihilists has slain one czar, and is an ever-present menace to the autocratic government of the empire. In China secret societies pervade every class of the population; some of them are continually hatching rebellion, and one of them, known as "Boxers," recently caused the attack on the legations at Peking, which provoked Europe and Japan to severe reprisals.

Beneficiary secret societies are dealt with under their several heads. Their secrecy is sufficient to assure against intrusion by the unauthorized while they are holding their meetings, and to enable one brother to recognize another. Universities and colleges have also their secret societies, which are entirely social and helpful in their aims.

Of secret societies with evil purposes the most noted is the Mafia, of Italy, which is said to have been introduced in the United States with the large Italian immigration, and to which many crimes have been ascribed. The Molly Maguires were a society in the Pennsylvania coal regions, about 35 years ago, organized for the objects of terrorism and murder. It was suppressed by a relentless prosecution on the part of the State, and the execution of the leaders. The Anarchists are not a society, in the ordinary meaning of that term, although they include many associations and clubs whose methods and plans are as secret as they are dangerous to law and order, and their official representatives.

Secret societies have as great a hold upon

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the people as at any period in history, and the proportion of the public who are members of such societies is greater than at any previous time—a fact chiefly due to the extensive growth of benevolent organizations, which usually include an insurance feature for the families of members. See *ESSENES*; *FRATERNAL SOCIETIES IN AMERICA*; *MASONIC FRATERNITY*, *THE*; *ODD FELLOWS*, and other secret societies under their respective titles.

Consult: Heckethorn, 'Secret Societies of All Ages'; Z. de la Hodde, 'Secret Societies of France'; Frost, 'Secret Societies of the French Revolution'; etc.

Secret Societies, College. See *GREEK LETTER SOCIETIES*.

Sec'retary-bird, or **Serpent Eagle**, a remarkable raptorial bird (*Serpentarius secretarius*) of South Africa, representing alone the family *Serpentariidae*, associated with the vultures. The general aspect of the bird is that of a long-winged, long-tailed, gray-and-black hawk mounted upon very long legs, so that as it stalks across a plain it might easily be mistaken for a crane. It runs with the speed of a horse and will fly when forced to do so, and may soar to a considerable height. It builds a big substantial nest in some bush or tree and re-occupies it from year to year. Their food consists of small animals and reptiles of all sorts, and especially of snakes, which it kills with a powerful forward kick, or, if the first stroke is not effective, repeats it with feet and knobbed wings, actively dodging the serpent's lunges, until the reptile is soon disabled or dead. These birds are frequently tamed and kept about the farmyard in South Africa as vermin destroyers. They take their name from the tufts of erectile feathers growing on each side of the head, which suggest a bunch of pens stuck behind a clerk's ear; the Arab name means "thirty ears." Consult Evans, 'Birds' (New York 1900).

Secretary of State, an officer whose business is to superintend and manage the affairs of a particular department of government. In the United States the secretary of state has entire charge of foreign affairs, consular agencies, and diplomatic matters. He is a member of the President's cabinet and is usually considered the prime minister and adviser to the chief executive. In Great Britain there are five secretaries of state, namely, those for the home, foreign, colonial, war, and Indian departments. The secretary of state for the home department has charge of the privy signet office; he is responsible for the internal administration of justice, the maintenance of peace in the country, the supervision of prisons, police, sanitary affairs, etc. The secretary for foreign affairs conducts all correspondence with foreign states, negotiates treaties, appoints ambassadors, etc. The colonial secretary performs for the colonial dependencies similar functions to those of the home secretary for the United Kingdom. The secretary for war, assisted by the commander-in-chief, has the whole control of the army. The secretary for India governs the affairs of that country with the assistance of a council. Each secretary of state is assisted by two under-secretaries, one permanent and the other connected with the administration. The chief secretary for Ireland is not a secretary of state,

though his office entails the performance of similar duties to those performed by the secretaries of state. In 1885 the office of secretary for Scotland was revived; he exercises in Scotland many of the powers and duties of the secretary for the home department, but has no cabinet rank by virtue of his office. The secretary to the admiralty is a subordinate member of the government, always a member of the House of Commons, in which he represents the admiralty when the first lord of the admiralty is a peer. A secretary of embassy, or of legation, is the principal assistant of an ambassador or envoy.

Sec'retion, the process whereby certain structures—glands or membranes—elaborate, separate, or secrete, from the common medium presented by the blood, definite and specialized products destined either for use in the economy of the body, or for being sent out of the organism. In this way the process of secretion subserves a double function, or exhibits a double aspect, inasmuch as it not only manufactures products for home consumption, as it were, but provides also for the removal of waste matters from the body. Substances or products elaborated for the use of the organism are named secretions. Products secreted only to be discharged from the organism are called excretions. Take the liver and its bile as an example of a true secretion destined—primarily, at any rate—for use in the body, that is to say, in the process of digestion and elaboration of food; then as an illustration of the excretory form of the process, observe the kidneys and their secretions, these organs secreting from the blood urea, carbonic acid, and other products which, in the form of urine, are destined to be discharged sooner or later from the body. The work of secretion is thus primarily seen to be among the most important of those actions the perfect performance of which contributes to the welfare of the organism; and interruption to the secretory processes results necessarily in the induction of disease of more or less serious kind. As both secretions and excretions are poured out from the secreting organ either upon the outer surface of the body or into some of its internal channels or ducts, it would appear that the two processes are identical in their ultimate aims and ends.

But true secretions (for example, bile and milk) consist of substances or compounds which, as such, do not exist in the blood, but demand a process of elaboration in the glands or secreting structures for their due and perfect formation. Excretions, such as the urine, consist of substances which exist in the blood in a ready-formed state. Secretions exist *potentially* in the blood, and require for their elaboration definite and special structures. Excretions actually exist in the blood, and demand for their elimination and separation processes more analogous to mere filtering, and less complicated than those demanded by the work of secretion. This latter distinction receives practical confirmation and support from the fact that when excretions are checked in their natural discharge they may appear in their characteristic form in the blood. This result is well seen in cases of suppression of urine through disease or injury of the kidneys. But if true secretions be checked they cannot, under the same or ordinary circum-

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stances, be detected in the blood; and removal of the secreting organ forever prevents the re-appearance of the secretion. A pent-up secretion may be re-absorbed by the blood, and be detected in that medium, but this does not affect the grand distinction to be drawn between the actual nature of and differences between the two processes.

The essential structural characters of a secreting surface consist, firstly, of a structureless primary or basement membrane; secondly, of blood-vessels, which bring the blood from which the secretion is elaborated; and lastly, of cells, or special structures devoted to the further elaboration of the constituents derived from the blood. A simple membrane, such as a serous or mucous membrane, exhibits the arrangement of these elementary parts in its simplest phase; while more complicated arrangements of the same essential parts result in the formation of the more definite secreting parts which we term glands. Of these structures, in themselves constituting most of the chief organs or viscera of the body, three great plans may be distinguished, so far as the arrangement of their elementary parts is concerned. Thus the simple tubular glands—well exemplified in the tubular follicles of mucous membranes, in the gastric follicles or glands of the stomach, in the sweat or sudiparous glands of the skin, etc.—consist of simple tubular involutions or depressions of the membrane which forms them, or with which they are connected. Each consists, therefore, of an open and elongated pouch or vesicle, the wall of which is composed of the primary membrane, while its lining is formed of secreting cells. This primary and elementary form of glands may be complicated by presenting a saccular rather than a merely tubular form, or by having the simple tube developed in a coiled form. The aggregated or conglomerate glands form the second division of gland structures. Such are the true mucous glands of the membranes of that name, the salivary and mammary glands, the prostate gland, and the pancreas or sweetbread. These glands exhibit an essential structure composed of rounded clusters of vesicles termed acini, grouped together in various ways, which contain gland-cells, and which open by minute ducts gradually uniting to form the main duct of the gland. These acini or vesicles, as before, are lined by secreting cells. The third variety of glandular structures is that comprised in the idea of convoluted tubular glands. The kidney and the testicle exemplify this latter class of structures. In these glands we find tubules of basement membrane of generally uniform size, presenting a convoluted appearance, and terminating either in blind pocket-like extremities or by dilatations, as seen in the Malpighian corpuscles. (See KIDNEYS.) Sometimes, however, such tubular structures may, as in the testicle, form a loop, and then return along their original course. The tubules are lined by their secreting cells, and in their tortuosity evince a structure which presents a large secreting surface frequently comprised within a very small space or extent.

The exact means or rationale whereby each gland is enabled, from the common medium furnished to all, to elaborate through its own special cells its characteristic secretion, presents a problem from the perfect solution of which

physiological science seems as yet far off. The cells of the liver contain bile; those of the mammary gland contain the fatty particles of the milk; and those of the testicle spermatozooids. But it can only be said that cells secrete; of the origin of these secreting powers and of the exact manner in which they are exercised nothing is known; yet that some acute and distinct specialization of the powers of secreting or gland-cells takes place over those of other and ordinary cells there can be no doubt whatever.

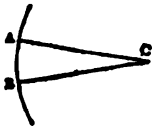
The view that secretion and the great process of nutrition (q.v.), to which secretion ministers, are identical is a reasonable and thoroughly consistent opinion. Viewed as mere organs, and apart from all purely functional considerations, the structure and formation of secreting glands might be regarded as simply processes of pure nutrition.

The greater the vascularity or blood-supply sent or distributed to any secreting organ the greater generally are its secreting powers. But the rate of circulation through a gland, or the mere quantity of the blood itself, cannot be shown to exert any direct influence on its secretory powers. Secretions may be retained for a lengthened period in some glands—such as the testicle—which are only periodically active, or they may be almost continually discharged, as is the case with the secretion of the kidneys. Under stimulation most if not all glands secrete more rapidly and abundantly, but the nature of the stimulation varies in different cases, or may be either of normal or abnormal kind. The discharge of secretions is effected by pressure from behind, while occasionally, as in the ureters and bile-ducts, the presence of muscular fibres aids in the expulsion of secretions. The particular quality of blood may affect secretion, as at certain times a greater quantity of a particular material may be contained in the blood, the presence of this material stimulating the action of some appropriate gland.

The influence of the nervous system is important in connection with the general conditions of secretion, but much belonging to this topic exists in a still obscure state. It is known, however, that by regulating the supply of blood to a gland the nervous system may indirectly operate in preventing or forwarding the work of any gland, and that through the agency of conditions acting upon the nervous centres and upon the motor and sensory nerves, effects are respectively wrought upon the glands. Food in the mouth induces a reflex action (q.v.), which action, produced through impressions made on nerve centres and reflected to the nerves of the salivary glands (q.v.) induces a copious flow of saliva through the stimulation of the glands. Mental conditions alone, and without material stimuli, will excite secretion, as seen in the flow of tears, or in the flow of saliva following the description of dainties; while the sudden stoppage of the milk secretion through fear or sorrow affords an illustration of the same fact. One secreting surface or gland bearing a functional relation to another gland (for example, kidneys and skin) may, through diminished or increased action, affect that other.

Sector, in mathematics, a part of a circle comprehended between two radii and the arc; or a mixed triangle, formed by two radii and

the arc of a circle. Thus A B C, contained within the radii C A, C B, and the arc A B, is a sector of the circle of which the arc A B is a portion. The term denotes also a mathematical instrument so marked with lines of sines, tangents, secants, chords, etc., as to fit all radii and scales, and useful in making diagrams, laying down plans, etc. Its principal advantage consists in the facility with which it gives a graphical determination of proportional quantities. It becomes incorrect, comparatively, when the opening is great, or the result greater than the data.



The sector is founded on the fourth proposition of the sixth book of Euclid, where it is proved that equiangular triangles have their homologous sides proportional. It consists of two rulers (generally of brass or ivory), representing the radii of a circular arc, and movable round a joint the middle of which forms the centre of the circle. From this centre there are drawn on the faces of the rulers various scales, the choice of which, and the order of their arrangement, may be determined by a consideration of the uses for which the instrument is intended.

Sects, Religious. See RELIGIOUS SECTS.

Secular Games, in Roman history, games celebrated at long and irregular intervals, and not, as their name would seem to indicate, once in every century. Under the republic they were known as the Tarentine games, from a place in the Campus Martius, called Tarentum, where they were celebrated, and appear to have been instituted about the time of the consul Valerius Publicola. Nothing is known of their origin beyond the fact that they were celebrated in honor of Pluto and Proserpina for the purpose of averting from the state some great calamity. Down to the time of Augustus they were held but three times; they were revived by that emperor in 17 B.C. with considerable pomp, occupying three days and nights, and being accompanied by sacrifices to Jupiter, Juno, and all the superior deities. For this occasion Horace wrote his 'Carmen Seculare' in honor of Apollo and Diana, sung by a chorus of youths and virgins. The secular games were celebrated on three subsequent occasions, namely, in the reign of Claudius in 47 A.D., in that of Domitian in 88, and in that of Philip in 248, exactly 1,000 years after the building of the city.

Secularism, an ethical system founded on the principles of natural morality and independence of revealed religion or supernaturalism. Its first postulate is freedom of thought—the right of every man to think for himself: this is now admitted, at least in theory, by most Christians; but it was not so when the platform of Secularism was first promulgated about the year 1846 by George Jacob Holyoake (q.v.) in England. Implied in this postulate as its necessary complement is the right to difference of opinion upon all subjects of thought. And this right would be nugatory without the right to assert difference of opinion. Finally, Secularism asserts the right to discuss and debate all vital questions, such, for example, as the commonly received opinions regarding the founda-

tions of moral obligation, the existence of God, the immortality of the soul, the authority of conscience, etc. Secularism does not maintain that there is no other good but the good of the present life: with that question it does not meddle; but it does maintain that the good of the present life is a real good, and to seek that is good; and it aims to find "that material condition in which it shall be impossible for man to be deprived or to be poor." In this life there are, it asserts, material agencies which cannot be neglected without folly or hurt, and that it is "wisdom, mercy and duty to attend to them." It does not combat the pretensions of Christianity; does not say there is no light or guidance save in nature; but maintains that "there is light and guidance in secular truth, whose conditions and sanctions exist independently, act independently, and act for ever."

Sec'ularists. See RELIGIOUS SECTS.

Securities. See BANKS AND BANKING; FINANCES; RAILROAD SECURITIES.

Security, Knights and Ladies of, a fraternal and beneficial society with headquarters at Topeka, Kan. Its income in 1902 was \$615,734 and its disbursements \$589,742. The association had over \$9,000,000 insurance in force in 1903.

Security of Person. See RIGHTS.

Sedalia, Mo., city of third class; county-seat of Pettis County and the largest city of the central portion of the State; on the Missouri Pacific and Missouri, K. & T. R.R.s; 189 miles west of St. Louis and 96 miles east of Kansas City.

History.—Prior to 1860 the present site of Sedalia was wild prairie. Foreseeing the building of the Pacific Railway, Gen. George R. Smith, a resident of Pettis County, acquired a tract of land in 1856, and 11 Nov. 1857 filed a plat of the town of Sedalia. The first settlement on the town site was in 1860, the railway reaching the place in January, 1861. Owing to the breaking out of the Civil War, and westward advance of the railway was delayed, and Sedalia for several years was the western terminus and an important military post and shipping point for the Southwest. The place was held by the Federal troops throughout the war, save for its capture, after a sharp fight, in October, 1864, by the Confederate general, Jeff Thompson, who was driven out the next day by Gen. A. J. Smith. The impetus in growth given to Sedalia during the war was afterward continued by its becoming a railway centre of importance, and its growth, though slow, has been constant.

Railroads.—Sedalia is the terminal point of four divisions of the Missouri Pacific and of three divisions of the Missouri, Kansas & Texas R.R., including the main lines and branches. The general car and repair shops of the latter road are located at this point, occupying 37 acres of ground, with buildings and machinery costing \$160,000 and employing 300 to 400 men. In 1904 the Missouri Pacific Railway Company established at Sedalia its general shops for repairs and construction of cars and locomotives for the entire system at an expense of over a million dollars and calculated for the employment of 2,000 men, the citizens donating \$230,000 in money and land as an inducement.

Manufactories, Trade, etc.—In 1909 there

were in Sedalia 75 manufacturing concerns, capital \$2,346,000, with 1,084 employees, product \$2,33,000. There are several large jobbing and distributing, packing and shipping houses.

Government and Finance.—The political system in Sedalia is peculiar and perhaps original. By mutual agreement all municipal and school officers are divided equally between the two great parties, the nominations of each being submitted to the other for ratification, both parties meeting in separate convention at the same time and in the same building for this purpose. The government is vested in a mayor and board of eight aldermen. Other officers are police judge, clerk, marshal, assessor, collector, treasurer and attorney. The total valuation for taxation in 1903 was \$4,463,372, being 40 per cent of cash value. Tax levy for current expense and sinking fund 1 per cent. Total revenue, \$84,000. Bonded debt, \$213,000, of which a part bears 4 per cent and the balance 4½ per cent.

Banking.—There are three national banks and one trust company, with total capital and surplus of \$485,598; deposits, July, 1904, \$2,241,233.76; also two loan companies. The banks operate a clearing house for the country banks in surrounding counties, clearings amounting to \$800,000 to \$1,100,000 per month.

Education.—Sedalia is noted for the excellence of its free schools. There are a dozen public school buildings, with furniture, libraries, etc., valued at \$200,000; 69 teachers. Besides the public schools are two business colleges, one college for colored students, supported by the M. E. Church, and several private and parish schools. The high school has a four-years' course and articulates with the State University.

Public Buildings, Parks, etc.—Court-house, a stone structure, costing \$110,000; city hall, market, government building, engine houses, etc., Carnegie Library, cost \$50,000. Public park of 50 acres in city and Forest Park, two miles out, owned by street railway company. The Missouri State Fair was located in Sedalia in 1901, and \$225,000 has been spent in buildings and improvements. There are 24 churches and three daily and several weekly publications.

Public Utilities.—Are represented by water, gas and electric company, with a capital of \$1,000,000, supplying 2,000,000 gallons of water per day, gas, electric light and power; a street railway company, operating nine miles of street railway, also furnishing electric light and power; a steam heating company, all operating under franchises protecting public and private rights.

Population.—(1900) 15,231; (1910) 17,822.

A. P. MOREY.

Sedan, sã-dân, France, a town in the department of Ardennes, near the Belgian frontier, on the Meuse River, opposite Torcy, and about 160 miles northeast of Paris. Its principal buildings are the theatre, public library, and college. The town has important cloth manufactures, employing the majority of the inhabitants. Its chief interest is historical, as connected with the defeat of the French army by the Germans, and the surrender of Napoleon III. with 100,000 soldiers to the Emperor of Prussia 2 Sept. 1870. Pop. about 22,000. See FRANCO-GERMAN WAR.

Seddon, sêd'ôn, James Alexander, American statesman: b. Falmouth, Va., 13 July 1815; d. Goochland County, Va., 19 Aug. 1880. He

was graduated from the law school of the University of Virginia and practised law in Richmond. He was a Democratic member of Congress 1845-7 and 1849-51, after which he retired to his estate. In February 1861 he was one of five delegates to the "Peace Congress" at Washington where he maintained the right of a State to peaceful secession. In July 1861 he was a delegate from Virginia to the Confederate provisional Congress, and in November 1862 became secretary of war in the Confederate cabinet. This position he held until the Civil War was nearly over, resigning 28 Jan. 1865 and retiring from public life.

Seddon, Richard John, New Zealand premier: b. Ecclestone, Lancashire, England, 1845; d. at sea 10 June 1906. Emigrating to Australia at 18 he was attracted to New Zealand four years later by the gold discoveries. He sat in the New Zealand Parliament in 1879-81 and 1881-90, later he became minister for defense and public works, commissioner of trades and customs, and finally rose to be premier. By profession he was a mining engineer, and he was an associate of the American Institute of Mining Engineers. He was the body and the soul of the New Zealand government.

Sedge, a common term indiscriminately applied to the many marshy plants of the family *Cyperaceæ*, and particularly to the genera *Cyperus* and *Carex*. The sedges are grass-like or rush-like herbs with slender stems, generally solid, often triangular, and but rarely swollen at the nodes. The leaves are pointed and narrow (the word "sedge" refers to their cutting edges), with closed sheaths, with or without reduced ligules, and are three-ranked. The flowers are either perfect or otherwise, and are very small, having a hypogynous perianth, generally consisting merely of bristles or scales, with from one to several stamens having slender filaments, and a simple, toothed, or cleft style. The fruits are one-celled and are lenticular or three-cornered. The tiny grass-like flowers are gathered into spikelets of one or more, each (or rarely a pair) in the axil of a scale, which may be persistent or deciduous; the spikelets are themselves arranged in various inflorescences, often in conspicuous umbels. The sedges frequent marshy lands, chiefly, and are occasionally useful in binding sea-sands or in contributing to the growth of peat-bogs.

Sedgwick, Catharine Maria, American author; daughter of Theodore Sedgwick (1746-1813): b. Stockbridge, Mass., 28 Dec. 1789; d. Roxbury, Mass., 31 July 1867. She was for many years the principal of a famous school for young ladies, and in her day was widely known as an American novelist. Her best known works are: 'A New England Tale' (1822-56); 'Redwood,' first published anonymously, translated into four European languages, and erroneously attributed to James Fenimore Cooper; 'The Traveller' (1825); 'Hope Leslie, or Early Times in Massachusetts' (1827); and 'The Linwoods' (1835). Consult Dewey, 'Life and Letters of Catharine Sedgwick' (1871).

Sedgwick, Ellery, American author: b. New York 27 Feb. 1872. He was graduated at Harvard University in 1894 and taught at Groton School, Mass., 1895-6. He was on the editorial staff of the Worcester *Gazette* 1896 and 'The Youth's Companion' 1896-1900; and since

SEDGWICK — SEDIMENTARY ROCKS

1900 has been the editor of 'Frank Leslie's Popular Monthly.' He has published 'Life of Thomas Paine' (1899).

Sedgwick, John, American soldier: b. Cornwall, Conn., 13 Sept. 1813; d. Spottsylvania C. H., Va., 9 May 1864. He was graduated at West Point in 1837 and served in the army from that time until his death, taking prominent parts in three wars and in many engagements against the hostile Indians in the West. During the Seminole War in Florida 1837-8, he was 2d lieutenant of artillery, was promoted in 1839, took part in the Mexican War 1846-7, and received promotion for gallantry after Churubusco and after Chapultepec. When the Civil War began he became lieutenant-colonel of artillery and rose to the rank of major-general. Stationed at first at Washington, he was afterward commander of brigade, then of division in the Army of the Potomac, being placed in command of the 6th army corps in 1863. He took part in the battle of Fair Oaks, the Seven Days' Battles, was severely wounded at Antietam, and after a leave rejoined the army in time for Chancellorsville and Fredericksburg. In 1864 he took part in the battles of the Wilderness and Spottsylvania, at which latter place he was shot by a Confederate sharpshooter during a movement of his troops. A bronze statue of him was erected at West Point in 1868. His death forms the subject of a painting by Julian Scott (q.v.), now in the Public Library at Plainfield, N. J.

Sedgwick, Robert, American colonist and soldier: b. England about 1590; d. Jamaica, W. I., 24 May 1656. He emigrated to Charlestown, Mass., in 1635, being one of the first settlers there; in 1638 assisted in organizing the Ancient and Honourable Artillery Company of Boston (having received his training in the Artillery Company of London), and two years later became its captain. He rose to the command of the province, in 1652. With John Winthrop, Jr., he helped establish, in 1643, the first iron works in the United States. Under Cromwell's orders he captured several French ports in the Penobscot territory and in 1655 he assisted in the capture of Jamaica. Cromwell raised him to the rank of major-general and made him governor of that island.

Sedgwick, Theodore, American jurist and legislator: b. Hartford, Conn., May 1746; d. Boston 24 Jan. 1813. He studied at Yale, was admitted to the bar in 1766, began practice at Great Barrington, Mass., and soon removed to Sheffield, where he attained eminence in professional and civil affairs, frequently representing the town in the Massachusetts legislature. At the beginning of the Revolution he entered the Continental army, serving on Gen. John Thomas' staff in the expedition to Canada, and later acting unofficially as commissary. In 1785-6 he was in the Continental Congress, and in the winter of 1787 was prominent in the suppression of Shays' rebellion (q.v.). He was speaker of the State house of representatives in 1788, and in that year also a member of the State convention for the ratification of the Federal constitution; from 1789 to 1796 a representative in Congress; and in 1797-9 United States Senator, being president *pro tem.* in 1797. Then he was again in the House, and its speaker until 1801. From 1802 until his death he was a justice of

the supreme court of Massachusetts, being noted on the bench for the clearness of his opinions. He was one of council who secured a decision (1780) by which such a construction was given to the constitution of Massachusetts as to abolish slavery in that State. He was an active Federalist, and a member of the American Academy of Arts and Sciences.

Sedgwick, William Thompson, American biologist: b. West Hartford, Conn., 29 Dec. 1855. He was graduated from the Sheffield Scientific School of Yale University in 1877 and later studied at Johns Hopkins University. He was an instructor at the former 1878-9; was at Johns Hopkins as a fellow in biology 1879-80; as instructor and associate professor of biology at the latter also 1880-3. Since 1883 he has been professor of biology in the Massachusetts Institute of Technology. He was biologist for the Massachusetts State board of health 1888-96. He is a joint author of 'General Biology' (1886); and published 'The Principles of Sanitary Science and Public Health' (1902).

Sedil'ia, in architecture, originally the rows of seats in a Roman amphitheatre. Later applied to the stone seats on the south side of the altar in Roman Catholic churches; used by the priest, deacon, and sub-deacon in the intervals of the church service. In cathedrals a row of such seats is provided for the clergy.

Sedimentary Rocks, a general term loosely applied to all rocks not of igneous origin. It comprises two types, the clastic and the non-clastic. The latter include all the rocks precipitated from solution in water (Hydrogenic); those precipitated from the state of vapor in the atmosphere (Atmogenic snow, snow-ice); and those precipitated by the physiological activities of organisms (Biogenic), either from the atmosphere (rarely the water), by plants (Phytogenic—coals, etc.) or from the water (rarely the atmosphere) by animals (Zoogenic; that is, organic limestones, shell oozes, etc.). These groups together with the igneous rocks (Pyrogenic) form the class of Endogenetic rocks, which have been directly deposited by internal forces from the states of fusion, solution or vaporization, into which the original rock magma of the earth became separated, and to one or other of which each rock may finally return. The clastic rocks constitute the class of Exogenetic rocks, in which the most characteristic feature—the fragmental condition—is due to external agents. Thus there are rocks made up of the reconsolidated fragments of older rocks, shattered by volcanic explosions (Pyroclastic rocks); or of those shattered or ground up by the movement of one rock mass over the other (Anticlastic); or of the fragments broken up by the atmosphere, frost, etc (Atmoclastic), or of those loosened and transported by the wind (Anemoclastic). Again there is the large class of rocks made up of water—broken and water-worn fragments (Hydroclastic), and finally those made up of rock fragments broken by plants, the lower animals or man (Bioclastic). In this latter group belong all artificial stones, such as brick, concrete, etc. Clastic rocks are divided according to the size of grain of the component fragments. Thus rubble rock, with the fragments above the sand grain size are *rudylites*; those of the sand-grain size are *arenylites*; while those composed of rock-flour or clay are *lutylites* or mud-rocks.

SEDITION — SEDUM

The corresponding textures are spoken of as rudaceous, arenaceous and lutaceous. All of these rocks may be simple or complex in chemical composition. The principal groups in which the composition is simple, are the silicious, the calcareous, and the argillaceous. A pure rubble rock of silica is a *silicirudyte*, a pure quartz sandstone is a *silicarenyte*, while a pure quartz mud-rock (novaculite) is a *silicilute*. The corresponding types of the calcareous group are: *Calcirudytes*; *calcarenytes* and *calcilute*s, and the principal argillaceous type is the pure clay mud-rock or *argillulite*.

The most important types of sedimentary rocks in the Endogenetic class are: Under the *Atmogenic* snow, and its metamorphic product — snow-ice. Water-ice is to be classed as an igneous (pyrogenic) rock, since it results from the solidification by cooling of a magma liquid at ordinary temperatures. Among the *Hydrogenic* rocks may be mentioned rock salt, chemically deposited limestones, such as tufas, stalactic deposits, etc.; gypsum and anhydrite, silicious sinter, etc.; and the principal bog-iron ores, and their metamorphic products. Under the *Bio-genic* division belongs phosphate rock or guano, coral and shell limestones, diatomaceous earths; peat, lignite and coals.

Under the *Pyroclastic* division of the *Exo-genetic* rocks may be mentioned volcanic agglomerates and breccias (*Pyrorudytes*) and volcanic tuffs (*Pyroarenites* and *Pyrolute*s). Under the *Anticlastic*, various fault breccias and material ground up under glaciers (since ice is itself a rock); under the *Anemoclastic* sand-dune rocks, either silicious *silicarenites* and *silicilute*s) or calcareous as in the Bermuda coral sand rock (*Atmocalcarenites* and *Atmocalcilute*s) or the more or less argillaceous 'loess'; under *Atmoclastic* reconsolidated rubble (breccias) or finer material (sand rocks or *atmoarenites*, and clayey rocks or *atmolute*s); under *Hydroclastic* the common conglomerates (*hydrorudytes*), sandstones (*hydroarenites*) and mud or flour-rocks (*hydrolute*s) of whatever composition, and under *Bioclastic*, the broken, ground or pulverized rock matter, reconsolidated for the various uses designed by man (*Biorudytes*, *bioarenites* and *biolute*s, with composition variable. See ARGILLACEOUS ROCKS; SANDSTONE; SAND-LIMESTONE; SLATES; SHALES; CONGLOMERATES.

AMADEUS W. GRABAU.

Sedition, an offense short of treason but more serious than ordinary breach of the peace, or conduct tending thereto. Sedition, as a distinct offense, is unknown to English law, and is also unknown to United States laws, save in acts of Congress relating to the army and navy, and there it evidently means a mutiny or uprising against superior authority, for it is provided that a soldier joining any sedition, or who being present at a sedition does not do his utmost to suppress the same, shall be punished with death, while a sailor uttering seditious words can be punished at the discretion of a court-martial. State laws relating to sedition treat it as a minor offense, to be punished when it amounts to an attempt, whether in speaking or writing, or by actual violence, to agitate the overthrow, by unlawful means, of established authority. Anarchist meetings are within this description; when they lead to riot and murder, as in the case of the Haymarket Riot, in Chi-

cago, the offense is more serious, and all parties concerned are held as principals or accessories to the crimes which resulted directly from their course of action.

The Alien and Sedition laws enacted by Congress in 1798 embodied an extension of the meaning of sedition which the majority of the American people evidently did not approve, and were aimed at freedom of speech and of the press. The motive for these laws was the suppression of the revolutionary tendencies excited by the French Revolution, the Republican (afterward called the Democratic) party sympathizing with the Revolution, and the Federalists being adverse at least to the extreme phases of that great convulsion. Several prosecutions under the Sedition law served to make it more odious, and the consequence was the retirement of the Federalist party from power, and the election of Thomas Jefferson to be President of the United States. Since that time, except during the late Civil War, no attempt has been made to interpret as sedition the editorial utterances of the press regarding current events. See ALIEN AND SEDITION ACTS.

Sedition Laws. See ALIEN AND SEDITION ACTS.

Sedley, sēd'li, Sir Charles, English poet, dramatist and wit: b. Aylesford, Kent, 1639; d. 20 Aug. 1701. He was educated at Oxford, but did not graduate. He wrote comedies and songs; of the latter one or two are still popular, but the former are unequal to his reputation. His first comedy, 'The Mulberry Garden,' partly founded on Molière's 'Ecole des Maris,' was published in 1668; and among his other works of this class are 'Bellamira or The Mistress' (1687), based on the 'Eunuchus of Terence'; and 'The Grumbler.' In later life he entered Parliament and took an active part in politics, uniformly opposing the unconstitutional policy of James II., and was one of the chief promoters of the Revolution.

Sedrat, the name given in the religious lore of the Mohammedans to the lotus tree, standing on the right-hand side of the invisible throne of Ali, with two rivers running from its roots. Its boughs extend farther than the distance between heaven and earth, numberless birds singing among them, and countless angels resting beneath their shade.

Sedum, a genus of the *Crassulaceæ*, the many species of which inhabit chiefly the North Temperate and Arctic zones. They have succulent, generally smooth foliage, of varying form, but often crowded on the stems, and have 4 to 5-merous flowers, with distinct petals, usually in cymose inflorescences and of pink or yellowish hue. The carpels of the fruit are separate or united at the base. The sedums are pre-eminently useful for rock-gardens, and for cultivation in plots or in poor soil, since they are remarkably hardy under adverse conditions. Some preferring barren rocks, and spreading luxuriantly over them, thus earning their common name of stone-crop. Like the house leeks (*Scempervivum*), which they closely resemble, they are easily propagated by seeds or offshoots, and are possessed of great vitality. *S. telephium* is the orpine (q.v.), live-for-ever, or live-long, so called because a cut branch, fas-

SEE — SEED TESTING

tened out of doors, will grow, and perhaps bloom, drawing upon the store of reserve tissue in its fleshy bulk, and since it will occasionally start into growth when pressed and dried it is also called Aaron's rod. This species was further known as Midsummer men, as it was used for love-charms on midsummer's night, two stems of it being set up to see if one, representing a lover, would turn to the other. *S. acre*, the English wall-pepper, is a common creeping plant covered with yellow, star-like flowers, fond of sunny, rocky places, and is an emetic and cathartic. One of the handsomest species is the old-fashioned border plant, *S. spectabile*, with upright stems and broad cymes of purplish flowers. *S. telephoides* and *S. roseum*, the rose-root or rhodia of old time shops, with its rose-scented root, make themselves conspicuous by growing in great masses on mountain ledges. *S. album* was formerly used as a medicine, and cooked or eaten as a salad under the name of worm grass or prickmadam.

See, Horace, American naval engineer: b. Philadelphia 17 July 1835. He received his training as a mechanical engineer in a machine shop. As superintendent engineer of the firm of William Cramp & Sons he was identified with its fame as the builder of high-class ships. He is known as the inventor of the hydropneumatic ash ejector, the cylindrical mandrel for face bearings, and other important mechanical devices. He is consulting engineer and naval architect for several noted corporations in the United States.

See, Thomas Jefferson Jackson, American astronomer: b. near Montgomery City, Mo., 19 Feb. 1866. He was graduated at the University of Missouri in 1889 and studied at Berlin until 1892. He aided in the organization of the Yerkes Observatory of the University of Chicago in 1893-6; participated in the observations of the Lowell Observatory in 1896-8 during the survey of the zone between 15° and 65° of the Southern heavens, resulting in the discovery of new double stars and the re-measurement of old ones; was professor in the United States Naval Academy in 1899-1902, and is now (1904) attached to the Naval Observatory. He has published 'Researches on the Evolution of the Stellar System' (1896).

See, a word applied to the seat or throne of a bishop, but more usually employed as the designation of the city in which a bishop has his residence, and frequently as that of the jurisdiction of a bishop, that is, as the equivalent of diocese. The Holy See is located in Rome. See **DIOCESE**.

See-adder, an English name for a marine Stickleback.

Seebohm, sē'bōm, Frederic, English economic historian: b. 1833. He was educated at Edinburgh and at Cambridge. In 1856 he became a barrister of the Middle Temple, but has devoted much of his attention to the study of the social organization of the Saxon, Celtic and early English tribes, and has published: 'The English Village Community' (1883-90); 'Tribal Custom in Anglo-Saxon Law'; 'Tribal System of Wales'; 'The Oxford Reformers: Colet, Erasmus and More'; 'The Era of the Protestant Reformation.'

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Seed Plants, plants of the highest branch of the vegetable kingdom, characterized by producing seeds (q.v.) as a result of the fertilization of their egg-cells, and called *Spermatophyta*, formerly known as the *Anthophyta*, and *Phanerogamia*. The first of these names is to be preferred, since it means "seed plants." The second which means "flowering plants" is less applicable, since in many plants, as the gymnosperms, there is properly no flower; and the third, meaning "visible marriage," is quite inapplicable, since the act of fertilization is very difficult to observe. There are more than 100,000 known kinds of seed plants, divided into two classes, namely: *Gymnosperms*, with naked seeds, and *Angiosperms*, with seeds enclosed in dry pods or fleshy fruits. The former, of which there are less than 500 kinds, include the pines, spruces, firs, cedars, cypresses, etc., while the latter include the lilies, grasses, orchids, buttercups, pinks, mints, roses, beans, parsleys, sun-flowers, and thistles. The Angiosperms are properly the "flowering plants" and in which alone the organs of the flower are fully developed. For the families of seed-plants see **VEGETABLE KINGDOM**.

Seed Testing, the determination of the purity and the viability of seed by natural or artificial means. The purity of seed embraces not only the idea of freedom from weed seeds, seeds of nearly related species, and such things as chaff, bits of stem, dirt, etc., but it also includes the idea of "trueness to type," or "purity of stock," as the seedsmen term it. This last, however, is generally a matter of seed-growing, the grower being held responsible for the ejection of "rogues," or plants which differ from the particular variety in hand. In some cases, for instance with certain varieties of peas, the rogues may be removed by sieves where they are smaller or larger than the type, or by hand-picking where the color as in certain beans indicates a difference. Winnowing is also useful in various cases. The presence of rogues always lowers the value of the sample and careful seed-growers and reputable seedsmen exercise constant vigilance in this respect. It is impossible, however, except with certain species or varieties, to recognize rogues by their seeds. Occasionally rogues are superior to the remainder of the crop; in such cases, when observed in time they may become important varieties, after due selection and growing by themselves for several years. For the satisfactory testing of purity of stock, samples of seed are grown in the field together with samples known to be pure and due comparisons are made, the conditions of soil, season, etc., being as nearly identical as possible. Trueness to type is far more important to the customer than either freedom from most impurities or a high per cent of germinable seeds, because the impurities can frequently be removed and deficiencies in germination may be adjusted by heavier sowings. Many specialists both in Europe and in America have devoted much time and study to the purity of seed; that is, the freedom from weed seed. Among their popular methods the following are most frequently used. Samples of equal weight are taken from various parts of the bulk and after thorough mixing a sample of this composite is taken. This is weighed and spread upon white

SEEDS

paper or glass, and the impurities are picked out by means of forceps, each kind of impurity being placed by itself. Any seed not of the kind examined constitutes an impurity; that is, radish seed would be an impurity in cabbage samples. Each kind of impurity is then weighed and its percentage determined. These percentages vary considerably with the different kinds of plants, cereal and most vegetable seeds being grown under clean cultural methods, and being generally easy to clean, should be nearly if not fully 100 per cent pure; whereas clovers and grasses, being grown without such cultural care, and being much harder to clean without considerable loss of good seed, may often have as much as 25 per cent of impurities. These percentages have been tabulated both in Europe and in America, and form a basis by which the experiment stations of both continents judge samples sent in for inspection. The next operation is the determination of the character of the impurities. If these consist of useful seeds they may not seriously affect the value of the sample; but if noxious weeds are present the sample is condemned, and if one per cent or more of ordinary weed seeds is found many specialists condemn the sample. The presence of Canada thistle, cockle, dodder, wild mustard, chess, wild-oats, Russian thistle, or of the bulbs of wild onion or garlic, even in small quantities, is generally sufficient to condemn the sample. These may all be seen with a hand-lens or even, in some cases, with the unassisted eye.

Germination tests are conducted either in soil under glass, out of doors, or in specially constructed germinators, some of which are rather elaborate in order to maintain particular conditions during the test. These devices are seldom used except in the botanical laboratories of agricultural experiment stations. Many of the leading seedsmen devote some of their greenhouse space to the testing of seeds for viability. Their methods are about as follows: The samples are taken in various ways; but frequently the operator estimates the percentage that from his experience he feels sure will not grow. Then he picks out 100 or 200 seeds that he thinks will germinate and plants them. Upon the basis of the estimate and the actual behavior of the sample planted, he figures the approximate value of the seed. When greenhouses are not available seeds are often sprouted between sheets of damp blotting paper, upon porous saucers, plaster of paris dishes, etc.—methods of value also for the home testing of seeds. Temperatures favorable to the germination of each kind of seed must be maintained; these range from about 45 degrees to 80 degrees or even more. Oat seed will germinate upon melting ice. Moisture and an adequate supply of air must also be given and daily inspection and the removal of the sprouted seeds are essential. Some seeds germinate in a few hours; others require weeks.

Otherwise seed-testing is more interesting than useful, and it has not the all-importance formerly attributed to it, because, under existing conditions, arbitrary standards can rarely be established, because systematic inspection would be too cumbersome and costly, and because the reputable seedsmen are on the alert to keep their stock up to the highest practical grade without other inspection than that they exercise them-

selves. With them the price of seed is usually a rather safe index of purity, viability, etc., the higher price, other conditions being equal, indicating the superior quality. Such should be given the preference, especially with grass and clover seeds and such other seeds as are difficult to clean.

For interesting tables, details of methods, descriptions of apparatus, etc., consult various publications of the Division of Botany, and the 'Year Books' of the Department of Agriculture; also an epitome of these in the 'Cyclopedia of American Horticulture' (New York 1900-2).

Seeds, the matured result of the fertilization of the ovule in phanerogamic plants, containing the embryo of a new plant like the parent and its food supply. Only one class of plants, the spermatophytes, develop true seeds; and this class is again subdivided according to the character of the ovules—whether naked and fertilized by pollen lying directly upon them (Gymnosperms), or enclosed in a pericarp, and fertilized through the medium of a stigma and style (Angiosperms). The simple seed or seeds and the surrounding pericarp, formed by structural changes in the persistent parts of the flower or stalk, constitute the fruit; and often a one-celled indehiscent fruit containing a seed is mistaken for the seed itself. The essential parts of a seed have been developed from those of the ovule; and are the nucleus or embryo, and its food supply, and at least one, but nearly always two integuments, although assuming different positions in the seed. The embryo is generally visible as a distinct differentiation in the seed tissues, and one or two leaves may be seen issuing from the short axis or stem portion of the embryo called the hypocotyl. These are the seed leaves or cotyledons. The number of cotyledons in Gymnosperms may vary from two to several; in Angiosperms, the embryo has either one or two, and this characteristic is so constant, that this class is further divided into monocotyledons or dicotyledons, according to the appearance of the seedling with one or two seed-leaves. The hypocotyl, often clasped between the cotyledons, bears at one end a mass of tissue called the plumule, where two tiny leaflets may sometimes be discerned, and at the other end another mass called the radicle. Very often nutritive tissue is formed between the embryo and the seed-coats, and may be hard or horny. This reserve tissue, or albumen, as it is called, when derived from the nucellus is called perisperm, but when developed within the embryo-sac is the endosperm. The embryo itself, when this external nutriment is absent, is filled with an accumulation of reserve material, especially in the cotyledons. When started into growth by the proper conditions of heat and moisture the embryo liberates itself in many ways. In some monocotyledons, where the nutriment is stored outside of the embryo, the one seed leaf is provided with absorbent cells at its apex and is connected with the cells of the reserve tissue at that point, transferring the sustenance to the young embryo. Among the dicotyledons in such seeds as the gourd, the radicle pushes out through an aperture in the seed-coat, and fastens itself in the ground with lateral rootlets. It carries out one end of the hypocotyl with it, but cannot disengage the other, clasped between the cotyledons in their tightly

fitting case, until the hypocotyl, arching itself in the effort to grow upward toward the light, finally exerts such a strain that the seed-case is ruptured, and the seed-leaves are pulled out. Then the hypocotyl straightens up and the two cotyledons turn green and act as foliage leaves. One often finds split acorns lying on the ground in early spring, anchored by a fleshy white thread. The embryonic leaves nearly fill the seed coats, and are thick, swollen and tense, clasping the hypocotyl. The acorns take up water from their environment, the embryo begins to grow, the seed-coats burst at one end, and the radicle, the hypocotyl and the thick stalks of the cotyledons are extended. The radicle turns downward into the soil, producing root-hairs, and the plumule, extricating itself from the clasp of the seed-leaves, starts upward, but the cotyledons themselves remain in the coats of the acorn, and gradually give up all their store of nourishment to the embryo and dwindle away. In the mangroves, the whole process of germination takes place while the seed is still on the tree, and the embryo itself tumbles into the mud with such force that it remains in position to continue growth.

The seed-coats are variously constructed, the inner usually a papery colorless membrane, or of a mucilaginous, easily-swelling nature; the outer one, the "testa," while sometimes of other hues, is more often brown, gray or black in color. It is usually made of several layers of cells, each of which may be differently fashioned, but often there is provision made for the extrusion of the embryo, and the hilum, or place of attachment, shows on the smooth or rough surface. There is also another growth occasionally developed from the base of the seed as it matures. This is either very small, mere fleshy ridges or bumps surrounding the base, and then called a caruncle, which often becomes a specific character as in the *Polygalaceæ*; or entirely or partially encloses the seed, being then known as an aril, as in the orange investments of the spindle tree and the mace. There are innumerable variations of the outer coats of seeds adapted to their needs of dispersion, protection and germination. Some seeds, like those of the quince, are enveloped in an adhesive mucilage which serves to cement them to the soil, so that the embryo may have a chance to strike into it, and certain smooth or polished seeds, when moistened, are capable of developing a similar mucilage either from the whole surface or from especial groups of cells. In such a case as that of the squirting cucumber, which violently ejects sticky seeds, the mucilage not only secures the seed to the ground, but to any animal that chances to touch one, and they are therefore carried to some distance. Birds are fond of the viscid mistletoe berries and often carry the seeds away on their beaks, wiping them off on a convenient branch, to which they stick and start growth.

Plants inhabiting loamy soils are likely to have seeds with irregular integuments, pitted and reticulated with delicate ridges which suffice to fix them in the soil, and others have developed spines for further anchorage. Others have a growth of hairs, which in riverside willows, for instance, adhere to mud, or in the Spanish moss, become entangled in the roughnesses of the bark. The growth of hair upon a seed, however, is of more general use in the dispersion of the

species. The cotton seed has a hairy investment which keeps it afloat in the wind, and the tufts of hair on fireweed and milkweed are familiar sights, sailing along in autumn and spreading these weeds far and wide. Some seeds instead of hairs, develop wings, as those of the cinchona and pine. Orchids have seeds so light and small that they drift away like dust.

Aquatic plants have seeds curiously adapted for dispersion by water. *Nymphaea* seeds are loosely enveloped in an aril, leaving an air chamber between it and the outer seed-coat, and the seeds therefore float and are driven about by the wind. Many smaller water plant seeds manage to keep afloat, and sometimes become entangled in the feathers of water fowl, to be transferred to other bodies of water. Very many seeds have extremely hard shells, and are practically impermeable to water like those sea-beans which come ashore on the Florida coasts, having traveled over seas. Some of these hard-shelled seeds are transferred from place to place by birds and animals which eat their pericarps and eject the seeds uninjured. The vitality of certain varieties of seeds is extraordinary, some of them retaining their powers of germination for 20 to 30 years.

See'ler, Edgar Viguera, American architect: b. Philadelphia, Pa., 18 Nov. 1867. He was graduated from the Philadelphia Central High School in 1884, entered an architect's office at once, and later studied architecture at the Massachusetts Institute of Technology, and the Ecole des Beaux Arts, Paris, where he was for three years under Victor Laloux. He returned to America in 1893 to accept the assistant professorship of design in the architectural department of the University of Pennsylvania, began independent practice in 1895, but in 1898 withdrew from teaching, though remaining staff lecturer and adviser in the architectural department. Among important buildings designed and erected by him are the Astronomical Observatory and the Dental Laboratory of the University of Pennsylvania; the Winona Free Public Library, Minnesota (with W. P. Laird); the Real Estate Trust Company's office building, Philadelphia; the First Baptist Church, Philadelphia, and the James V. Brown Memorial Library, Williamsport, Pa., as well as many city and country residences. He was elected a fellow of the American Institute of Architects in 1900, and a member of the faculty of the Pennsylvania Academy of the Fine Arts in 1902.

Seeley, sé'll, Sir John Robert, English historian and essayist: b. London 10 Sept. 1834; d. Cambridge 13 Jan. 1895. He was graduated from Christ's College, Cambridge, in 1857; was elected fellow and made classical lecturer there; published (under the pseudonym "John Robertson") a book of poems (1859); was appointed in 1863 professor of Latin in University College, London, where he continued until 1866; and in 1865 published 'Ecce Homo,' in many respects the best, and certainly the best-known, of his works. It was a simple account of the life and teaching of Christ, dealing with these, however, as the title indicates, wholly from the mortal side. Owing to the title and the limitation in scope of the volume, the author was held to deny by implication certain doctrines, a discussion of which he had purposely omitted. There followed a discussion in which Newman, Glad-

stone, and Stanley were numbered among the participants. In a later edition Seeley in a preface defended himself against misconception. He was professor of modern history at Cambridge in 1869-95. Further publications of his are: 'Natural Religion' (1882); 'The Expansion of England' (1883), a popular narrative from the imperial viewpoint; 'The Growth of British Policy' (1895); and 'The Life and Times of Stein' (1878), his chief contribution to historical knowledge.

Seelye, sē'li, Julius Hawley, American college president: b. Bethel, Conn., 14 Sept. 1824; d. Amherst, Mass., 12 May 1895. He was graduated from Amherst in 1849, and afterward studied theology at the Auburn Theological Seminary and at the University of Halle. From 1853 to 1858 he was pastor of the First Reformed Dutch Church of Schenectady, N. Y., from which charge he was called to the presidency of Amherst College. He was a member of the 44th Congress from Massachusetts, and was later engaged in the revision of the tax laws of that State. His writings include: 'The Way, the Truth, and the Life' (1873); 'Christian Missions' (1875); 'Empirical Psychology' (1882); 'Citizenship: a Book for Classes in Government and Law' (1894).

Seelye, Laureus Clark, American college president, brother of J. H. Seelye (q.v.): b. Bethel, Conn., 20 Sept. 1837. He was graduated at Union College in 1857 and during the next six years he was engaged in theological study at Andover, Mass., Heidelberg and Berlin. After a brief pastorate in the Congregational denomination he accepted a call to the chair of English literature at Amherst in 1865, and in 1873 became the president of Smith College. His best known books are: 'The Ambiguity of Celtic Literature' (1870); 'Our Celtic Inheritance' (1870); 'The Ancient Fenians' (1871); and 'The Higher Education of Women: its Perils and its Benefits' (1888).

Seer, sēr, a weight in India, formerly varying in different parts of the country, but by an act of the Anglo-Indian government 31 Oct. 1871, the seer was adopted as the primary standard of weight, and made equivalent to a kilogram.

Sefatians. See MOHAMMEDANISM.

Segan-fu, sē-gān'foo, China. See SINCAN-FU.

Segar. See CIGAR.

Segesta, sē-jēs'ta (Gr. *Egesta*), Sicily, the northwestern extremity of the island, lies 11 miles from Castellamare (q.v.), its port. Its interest is wholly historical, as the site is now deserted. Segesta was built upon a steep mountain, now known as Monte Barlaro, on the river called at present 'Fiume Gaggera'. It formed an alliance with Athens in 416 B.C., and in 413 with the Carthaginians (after the fall of Syracuse). In the first Punic war, it became subject to Rome, thus acquiring the name Segesta. The ruins of the ancient city are extensive; the most remarkable are the Greek theatre and temple.

Segmentation of the Egg. See EMBRYOLOGY.

Segóvia, sē-gō'vī-a (Sp. *sā-gō'vā-ā*), Spain, (1) capital of the province of the same name,

on the Eresma, 43 miles northwest of Madrid, occupies a rugged height (3,300 feet), surrounded by ancient walls and defended by a turreted castle, the Alcázar. Its old-fashioned buildings are quaint but stately; its cathedral, a fine specimen of the Gothic, is scarcely surpassed in Spain. There are besides several other churches, suppressed convents, bishop's palace, mint, military academy, church seminary, theatre, hospitals, and a picture gallery. The lofty aqueduct (built by Trajan) is the finest Roman ruin in Spain. Paper, linen and glass are manufactured. The kings of Castile and Leon made Segovia their place of residence. In 1808 the town was entered and sacked by the French troops.

(2) The province covers an area of 2,713 square miles, whose surface is diversified by mountains and plains. The Sierra de Guadarrama, containing the famous defile of Somosierra, is the principal mountain. Silver, copper, lead, iron, marble, and jasper are found in the mountain districts. The chief agricultural products are wheat, barley, madder, flax, hemp; besides grapes, olives, carobs and chestnuts. Large numbers of sheep are raised. Pop. about 165,000.

Segregation, in geology that tendency of mineral ingredients to separate from the parent magma, and to crystallize out, each by itself. In granite and other crystalline massive rocks, vein-like portions are found in which the matter is either coarser or finer than the rest of the mass. These were produced at the final stage of cooling of the rock, when the segregation from the original molten or viscous mass occurred along certain lines or around particular centres. These are termed segregation veins. Cracks or cavities may also be filled with mineral matter segregated from the surrounding rock mass. See VEIN, MINING.

Segu, sā'goo, or Sego, sā'gō, West Africa, an important town of the French Sudan, in Bambara, on the left bank of the Niger, about 30 miles above Sansandig, and 350 from Timbuktu. The houses are built of clay, of a square form, with flat roofs; some of them have two stories, and many of them are whitewashed. Besides these buildings Moorish mosques are seen in every quarter. This town has been for many centuries a stronghold for the Mohammedan faith. Pop. 30,000.

Seguidilla, sēg-ī-dēl'yā, a Spanish form of versification, consisting of four lines, generally assonant lines, of seven and five syllables alternately. It usually has a close of three verses, called *estribillo*, of which the first and last lines rhyme.

Seguin, sā'gwīn, Edouard Onesimus, American physician: b. Clamecy, France, 20 Jan. 1812; d. New York 28 Oct. 1880. He was educated at the college of Auxerre and Saint Louis and studied medicine under Jean Gaspard Itard. The latter urged him to undertake the treatment of idiocy, and after careful study of the causes and conditions of congenital delinquencies, he opened the first school for the training of idiots in 1839. In 1844 a committee of the Academy of Sciences examined and commended his methods. After the revolution of 1848 he settled in the United States. In 1873 he was American commissioner to the Vienna

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exposition and published a 'Report on Education.' During his later years he gave attention to the study of animal heat and invented a physiological thermometer. He was connected with various medical societies and president of the Association of Medical Officers of American Institutions for Idiotic and Feeble-minded Persons. His published contributions to the subject include, 'Théorie et pratique de l'éducation des idiots (1841-2); 'Traitement moral, hygiène et éducation des idiots et des autres enfants arriérés' (1846); 'Historical Notice of the Origin and Progress of the Treatment of Idiocy,' translated by J. S. Newberry (1856); 'Idiocy and its Treatment by the Physiological Method' (1866). Besides these he wrote a number of works on medical thermometry.

Seguin, Edward Constant, American physician and neurologist: b. Paris, France, 1843; d. New York 19 Feb. 1898. He was the son of Dr. Edouard Onesimus Seguin (q.v.), and came with his father to America after the revolution of 1848. He was educated in the public schools of Ohio, began studying medicine with his father in 1861 and continued it at the College of Physicians and Surgeons in New York. He spent two years in the medical department of the Union army while enrolled as a student, and contracted a tubercular difficulty, to cure which he served among the United States volunteers at Little Rock, Ark., during part of 1864-5, and again in New Mexico during 1868-9. During the winter of 1869-70 he studied nervous diseases under such Parisian specialists as Brown, Sequard, Charcot, Ranvier, and Cornil, and on his return to New York entered a medical partnership with Dr. W. H. Draper. He was appointed pathologist to the Connecticut Hospital for the Insane at its opening, and held the post 10 years. From 1871 to 1885 he was a member of the faculty of the College of Physicians and Surgeons, giving lectures on the spinal cord and on nervous diseases. In 1873 he founded a clinic for nervous diseases. Apart from these duties he carried on an independent practice in his specialty, beginning with 1876. He was one of the founders of the American Neurological Association, and the New York Neurological Association. He bequeathed to the Academy of Medicine his large collection of books and pamphlets relating to nervous diseases, and to the College of Physicians and Surgeons other books and instruments.

Séguir, sā-gūr, Joseph Alexandre, French writer: b. Paris, France, 1756; d. there 1805. He was author of operas and comedies which are still read, and also wrote: 'Correspondance secrète entre Ninon de l'Enclos, le Marquis de Villarsceaux et Mad. de Maintenon'; 'La Femme Jalouse'; etc. A selection of his works has been published, 'Œuvres diverses' (1819).

Séguir, Paul Philippe, COUNT DE, French historian, son of the preceding: b. Paris, France, 4 Nov. 1780; d. there 25 Feb. 1873. He entered the army in 1796 and rose to be brigadier-general and aide-de-camp to Napoleon during the Russian campaign. He was made a peer by Louis Philippe, and after the second Restoration retired to private life. He wrote: 'Histoire de Napoléon et de la Grande Armée pendant l'Année 1812' (1824); 'Histoire de Russie' (1829); 'Histoire de Charles VIII.' (1835).

Séguir-d'Aguesseau, dā-gě-sō, Louis Philippe, COUNT DE, French dramatist and historian, brother of the preceding: b. Paris, France, 10 Dec. 1753; d. there 27 Aug. 1830. He was forced by his father to enter military life, served under Rochambeau in America, was appointed ambassador to Russia in 1783, and after the overthrow of the monarchy devoted himself to literature. He was appointed a member of the council of state by Napoleon and after the Restoration was received into the Chamber of Peers. He published: 'Théâtre de l'Hermitage' (1798); 'Tableau historique et politique de l'Europe de 1786-96' (1800); 'Mémoires ou Souvenirs et Anecdotes' (1825); 'Œuvres complètes' (33 vols., 1824-30).

Segura River, sā-goo'rā, Spain, a river rising in the province of Jaén, and flowing eastward in a winding course, past the city of Murcia, into the Mediterranean Sea. It enters the latter about 45 miles north of Cartagena after a course of 150 miles. In its upper course it flows through arid heath-lands, but lower down it has been made to irrigate its valley by means of numerous canals, the result being the proverbially fertile *Huerta de Murcia*. As a consequence of drawing off the water, however, the main channel is practically unnavigable.

Seidl, Anton, Hungarian composer and musical director: b. Budapest, Hungary, 6 May 1850; d. New York 28 March 1898. He studied at the Leipsic Conservatory, and later at Budapest under Hans Richter, and by that musician was recommended to Richard Wagner when the latter was preparing for the opening of the Baireuth Festspielhaus. As a consequence he came into intimate association with Wagner and acted as stage-manager during the first season of music dramas there in 1876. In 1878 Seidl became musical stage manager at the Royal Opera House, Vienna, and the next year migrated to Leipsic where he was made conductor. After conducting the Nibelung dramas at London in 1882 he joined a company traveling through Germany, Austria, Hungary, Italy, Belgium and Holland during the seasons of 1883-4, which produced only the Wagner operas. He was made conductor at the Metropolitan Opera House, New York, in 1885 after the death of Dr. Leopold Damrosch, and thenceforth, though he made temporary sojourns in Europe filling musical engagements, he regarded America as his home. His influence upon the development of musical taste in this country was extended. Besides being made conductor of the concerts of the Philharmonic Society he was the organizer of the popular concerts held during several successive summers at Brighton Beach.

Seidlitz (sēd'līts) Powder, an aperient powder named after Seidlitz or Sedlitz in Bohemia. Seidlitz powders are prepared in two parts, each contained in a separate envelope. The alkaline portion, which is contained in a blue paper, consists of 2 drams of Rochelle salts (tartrate of soda and potash) and 40 grains of bicarbonate of soda; and the acid part, in a white paper, of 35 grains of tartaric acid. In preparing for use, the alkaline portion is dissolved in half a tumbler of water, and the acid part is then added, producing effervescence; and the draught is to be taken while the effervescence

is going on. Sometimes a little sulphate of magnesia is added to increase the strength.

Seigniorage, sě'nyór-āj. See COINAGE; FINANCE.

Seine, sãn (ancient, SEQUANA), a river in France, which rises in the department of Côte-d'Or, at the southwestern extremity of the Plateau de Langres, on the northern slope of Mont Tasselot, in the Bois de Chanceaux, about six miles northwest of Saint Seine and 20 miles northwest of Dijon. The first part of its course is north-northwest through the departments of Côte-d'Or and Aube, passing Châtillon and Troyes. After receiving the Aube at Marcilly, it proceeds almost due west, passing Nogent, and entering the department of Seine-et-Marne, receives the Yonne at Montereau, and shortly after the Loing, and the Loing Canal, all on the left. Here its course becomes again north-northwest, and it proceeds through the departments of Seine-et-Marne, passing Melun; the southeast of Seine-et-Oise, passing Corbeil; and Seine where, shortly before entering Paris, it receives the Marne on the right. Traversing Paris it shortly after commences a long series of remarkable windings, receives the Oise on the right, traverses the northwest of Seine-et-Oise, passing Mantes; the department of Eure, passing Pont de l'Arche, and receiving the Eure; and that of Seine-Inférieure, where it flows through Rouen. Resuming its series of windings across the southern part of that department it forms a long and wide estuary and finally joins the English Channel near Le Havre. Its direct course is 270 miles; its winding course about 500 miles. Of the latter, 350 miles, commencing at Méry, below Troyes, in the department of Aube, are navigable, but only by barges, which require to be tracked against the current if not moved by steam. The navigation properly commences at Rouen, from which to the port of Havre the river is usually distinguished by the name of the Seine-Maritime, and at full tide floats sailing vessels of from 400 to 500 and steamers of 600 to 800 tons. Its estuary is much encumbered by shifting sandbanks and dredges are constantly employed to remedy this evil. At the time of the equinoctial gales and at spring-tides a "tidal bore" locally the *mas-caret*, with a perpendicular front rushes up the river with a great noise as far as Jumièges, and sometimes even to Rouen. The area of the basin of the Seine is 16,700 square miles. The river is well supplied with fish. The scenery, though in parts surpassed by the Loire, Saône, and Garonne, taken as a whole, with the hills and valleys, forests and meadows, superb mansions, numerous villages, populous towns, and famous cities which line its banks make the Seine the finest river in France.

Seismograph, sis'mō-grăf, or **Seismometer**, an instrument for recording the period, extent, and direction of each of the vibrations which constitute an earthquake. For a complete seismograph, three distinct sets of apparatus are required: (1) To record horizontal motion; (2) to record vertical motion; and (3) to record time. The horizontal and vertical motions must be written on the same receiver, and if possible side by side, while at the instant at which the time is recorded a mark must be made on the

diagram which is being drawn by the seismograph. The first instruments were merely modifications of the SEISMOSCOPE (q.v.), but successive improvements have been introduced, and the seismograph has been brought to a high pitch of perfection. Some of the best, if not the best, forms known are in use in the Imperial Observatory at Tokyo, Japan.

Seismology, that branch of physical science which is concerned with the study and investigation of the phenomena of earthquakes, their causes and effects, their distribution, and the various circumstances attending their occurrence. Its pursuit is regarded as of the utmost importance to geological and other forms of terrestrial research. Seismology, however, is not limited to the study of earthquakes in the usual restricted sense, but deals with related phenomena occurring under many and differing aspects. According to leading authorities, it should investigate minute movements or tremors of the earth which escape ordinary observation; pulsations of the earth which, by reason of the length of their period, are not noticed; and oscillations, or elevations and subsidences of the earth which slowly alter the relative land and sea levels. Seismology has been developed almost wholly since the beginning of the 19th century, and must still be regarded as in the early stages of its progress; but already it has a great and growing body of materials and of literature, and its possibilities seem to point to the application of the science in practical ways. One of these, it is confidently predicted, will be the warning of dwellers in seismic regions when earthquakes or similar disturbances impend. See EARTHQUAKE.

Seis'moscope, the earliest and simplest form of earthquake recorder. The first known was invented by a Chinese named Choko, in 136 A.D., and shows the occurrence and direction of an earthquake by the fall of a column, a principle which was afterward independently adopted in the West. Vessels filled with viscid liquids have been used; the height to which the liquid is washed up the side of the vessel being taken to indicate the intensity, and a line joining the points of maximum motion to denote the direction of an earthquake. Palmieri's seismoscope consists of horizontal tubes turned up at the end, partly filled with mercury. To intensify the motion of the mercury, small floats of iron are placed on the surface, attached by threads to a pulley provided with indices moving in front of a scale of degrees, whence the intensity may be read off. The direction is determined by the azimuth of the tube giving the maximum indication, several tubes being placed in different azimuths. Pendulum seismoscopes both swinging and fixed, have also been employed. See SEISMOGRAPH.

Seistan, sās-tān', or **Hamun Lake**, Afghanistan, a large, irregularly-shaped, shallow lake or swamp on the western frontier adjoining the Persian province of Khorassan; a division of this province is name Seistan after it. The lake is not a single expanse of water, but is divided into three depressions. A great part of the area is generally dry; but, as the basin has no outlet, when the Helmund and its other feeders are in flood this lake regularly overflows its boundaries, fertilizing large tracts of country.

Seitz, zits, Anton, German painter: b. Roth, near Nuremberg, 23 Jan. 1829. He was in early years the pupil of the copperplate engraver F. Wagner; subsequently of Reindel, director of the Art Academy at Nuremberg, and in 1850 began the serious study of painting in Munich under G. Flüggen. In his 50th year he had made some reputation as a painter of small canvases with genre subjects taken from the lives of the bourgeoisie. He executed minute figures with such fineness that he quickly rose to the first place in the Munich school as an artist of this specialty. With keen analysis of character and the strongest power of expression he unites a charming feeling for perspective and chiaroscuro in grouping his characters under the light of an inner room; while his sense of humor is delicate and refreshing. His chief works are: 'The Beggar Musician and his Daughter'; 'Policeman and Country Girl'; 'Rustics and the Quack Doctor'; 'The Photographer in the Country,' etc.

Seixas, sêk'sas, Gershom Mendes, American patriot and minister: b. New York 14 Jan. 1745; d. there 2 July 1816. He was a son of a refugee from Lisbon who settled in New York about 1730, and choosing the Jewish ministry as his profession in 1766 was placed in charge of the Spanish and Portuguese Synagogue of his native city. On the outbreak of the Revolution he espoused the American cause, closing the synagogue rather than continue it under British rule. While the majority of his people went to Philadelphia he settled in Stratford, Conn., until in 1780 he was asked to organize a synagogue in Philadelphia, the "Mikve Israel," where he continued to display his patriotic zeal. Owing largely to his efforts on 23 Dec. 1783 a modification in the test clause in the Pennsylvania constitution was made, whereby Jews were subjected to no disqualification for office. After the evacuation of New York in 1784, the old synagogue was re-established and Seixas resumed his former charge. In 1787 he was appointed one of the trustees of Columbia College, holding the office uninterruptedly until 1815. When Washington was inaugurated in 1789 Seixas was selected as one of the ministers to take part in the ceremonies.

Sejanus, sê-jā'nūs, Lucius Ælius, son of a Roman knight, and favorite of Tiberius: b. Vulturni in Etruria; d. Rome 31. In 14 A.D. he was made commander of the Prætorian bands, and acquired the confidence of the suspicious Tiberius, to such an extent as to govern him completely; while the servile senate paid complete deference to the powerful favorite. The Prætorian cohorts were also favorable to him, and there was no obstacle in the way of his attaining the supreme power he aimed at but Drusus, son of Tiberius, and the sons of Germanicus, Drusus and Nero, the nearest of kin to the emperor. Drusus was put out of the way by poison; the latter, with their mother, were banished and thrown into prison, a step which they did not long survive. Several friends of Germanicus were beheaded at the instigation of Sejanus; and when Tiberius finally retired from Rome, and withdrew from the government, Sejanus governed with absolute power, and the senate ordered that the statues erected in his honor should be publicly worshipped. But at the

moment of his highest elevation the suspicions of Tiberius were awakened, and his measures were taken so cautiously, that Sejanus suspected nothing until openly accused by the emperor before the senate. He was then imprisoned, condemned to death, and executed on the same day. The historian Tacitus has given a searching and vivid, although possibly a prejudiced, account of the character and intrigues of Sejanus, while his fate is the subject of a tragedy of Ben Jonson's. Consult Jülg, 'Vita Lucii Ælii Sejani' (1882).

Sek'akul, an African parsnip (q.v.).

Selachii, sê-lā'kī-i, the order of fishes now known more generally as the *Elasmobranchii*, which includes the sharks, rays, and their allies. See ICHTHYOLOGY, SHARKS, etc.

Selaginella, se-lāj-ī-nē'l'a, a genus of vascular, heterasporous cryptogams, representing the *Selaginellaceæ*, and closely allied to the club mosses (see FERNS AND FERN-ALLIES). The sporangia are gathered in flower-spikes or cones, at the end of leafy branches, a sporophyll subtending each sporangium, which may contain either micro or macro-spores, and springs from the stem above the leaf-axil. These Sporangia become inflated and nodular, or flattened, and are dehiscent, the wall splitting into two valves which curve back from a boat-shaped basal portion, and by contracting, expel the spores. The selaginellas are very numerous, and widely distributed in warm regions. They much resemble the club-mosses in habit, but are generally quadrangular, the two lower rows of small one-veined leaves larger than the upper two rows, which are moreover appressed and give a flattened look to the fronds. The development of a small membranous ligule at the base of the leaf, on the dorsal side, is characteristic of this order. They are generally creeping plants, often forming moss-like mats of foliage, but are sometimes erect, in some species, which are supported by other plants, attaining a length of several yards. Selaginellas are cultivated in green-houses, not only as pot plants, but for edgings, and for hiding bare earth, with their verdant foliage, sometimes iridescent, or changing in hue. *S. lepidophylla*, a Mexican species, growing in flat rosettes, while not very beautiful, is one of the familiar resurrection plants. It is one of those herbs which become desiccated in time of drought, reviving in moisture. When thus dried out, it rolls its branches inward forming a ball, and is exported in this condition. If it be placed in water the brown stems uncurl, flatten out into fern-like fronds, and show their vivid green upper surfaces in a life-like fashion; and if this be done within a reasonable time after its uprootal, the selaginella will start into a new, genuine growth.

Selah, sê'la, a Hebrew word which occurs 71 times in the book of Psalms and three times in the prayer of the prophet Habakkuk (Hab. iii.), and is retained in the English Authorized version of the sacred texts: in the Septuagint version it is represented by the word *diapsalma*. Its signification cannot be definitely ascertained, but commentators interpret it variously as indicating either a pause, or repetition, or the end of a strophe, or playing with full power, or a short recurring symphony, or, finally, a bending of the body in reverence.

SELBORNE — SELENIUM

Selborne, sēl'börn, Roundell Palmer, 1st EARL OF, English statesman: b. Mixbury, Oxfordshire, 27 Nov. 1812; d. Petersfield, Hampshire, 4 May 1895. He was graduated from Christ Church, Oxford, in 1834 and was called to the bar in 1837. He was returned to Parliament for Plymouth in 1847, became solicitor-general in 1861, and was attorney-general in 1863-6. He was knighted in 1861 and subsequently was made Baron Selborne. He was appointed lord chancellor in 1872 and did much to aid the establishment of a supreme court of judicature in 1873, but on the fall of the ministry in 1874 he again went out of office. He was reinstated as lord chancellor in 1880, was created Earl of Selborne in 1882, and in 1886 he separated from Gladstone on the Home Rule question and thereafter his political work was concerned chiefly with legal reform. He published: 'The Book of Praise' (1863); 'Notes of Some Passages in the Liturgical History of the Church of England' (1878); 'Ancient Facts and Fictions Concerning Churches and Tithes.'

Selden, John, English scholar and statesman: b. Salvington, Sussex, 15 Dec. 1584; d. London 30 Nov. 1654. He was educated at Oxford and afterward called to the bar of the Inner Temple. His first work, 'Analecton Anglo-Britannicon,' was a history of civil government in Britain before the Norman conquest. This notable publication was followed by two others dealing with the later progress of English law, and with the history of English titles of honor. His 'History of Tithes' (1618) so offended James I. that its author was severely censured by the High Commission court, and later cast into prison by the king for denying that Parliament owed its privileges to the crown. As a member of the first two parliaments of Charles I., in the second of which he supported the impeachment of the Duke of Buckingham, and in the famous Long Parliament in 1640, his career was marked by great zeal for the advance of civil and religious liberty. In 1629 he published the work upon the Arundel Marbles ('Marmora Arundellia'), for the translation of whose inscription he is famed: Consult: Wilkins' collection of Selden's works, with life of the author (1726), and Aikin, 'Life of Selden.'

Selectmen, a name given in the New England States to the chief officer of a town or village. English parishes had their vestries, which were of two sorts, common vestries, composed of all the rate-payers and select vestries. In the latter, concerns were managed by select vestrymen. Hence the term selectmen, as used in New England, for the governing board of a town. The practice is found in Massachusetts as early as the issue of the 'Body of Liberties.' The selectmen acted under the orders of the town-meeting. See TOWN AND TOWN MEETINGS.

Selene, sē-lē'nē. See LUNA.

Selenga (sā-lēng'gā) River, Asia, a river rising in the Khangai Mountains in western Mongolia, flowing northeast through Mongolia and the Russian Transbaikial district, and emptying into Lake Baikal near its southern end. It is 750 miles long, and navigable for light vessels to its junction with the Orkhon. It receives through the Egin-kol the overflow of the large lake Kosso-gol. The Selenga is the main head-stream of the Angora, the principal tributary of the Yenisei.

Selenite, the crystallized or distinctly foliated variety of the mineral gypsum, hydrous calcium sulphate. It is number 2 in the scale of hardness, is flexible, but when broken has a "fibrous fracture" which consists of two imperfect cleavages. When pure it is colorless and transparent. The cleavage plates have a pearly lustre which is characteristic of the clinopinacoid, while the other faces of the crystal are subvitreous. Plates of selenite several feet across and perfectly transparent, are not uncommon, while crystals five feet in length have been found in Utah. Fine large crystals are also found in Italy, France and Switzerland. Limpid crystals of matchless beauty occur in the Sicilian sulphur mines. Twin crystals are common in all these localities, the most typical of which are the "fish-tail" twins. Foliated selenite is abundant in Nova Scotia, also at Lockport and elsewhere in New York, while crystals of model-like perfection are found near Ellsworth, Ohio. Like massive gypsum, selenite is an exceedingly common mineral. It has been used to some extent as a filler for paper, paints, etc.

Selenium, symbol Se, atomic weight 79.2. It was discovered by Berzelius (1817) in the refuse of a sulphuric acid factory. A non-metallic element occupying an intermediate place between sulphur and tellurium. Occurs in the free state in small amounts usually associated with native sulphur. Found in many minerals combined with various metallic elements as copper, lead, mercury, silver, etc. Here again the compounds of selenium are found in company with the analogous compounds of sulphur. Free selenium is prepared from the compounds of selenium found in the dust deposited in the furnace flues where sulphides are burned in the manufacture of sulphuric acid. This is oxidized to selenious acid (see below) which upon treatment with sulphurous acid gives selenium.

Selenium exists in two allotropic forms. The one obtained as above is a red amorphous powder soluble in carbon di-sulphide, while if this powder be melted and again cooled suddenly to 210° C. it forms a dark vitreous mass insoluble in carbon di-sulphide. Crystalline forms are also known.

In general chemical behavior it is closely related to sulphur and tellurium, all three forming analogous oxides, oxygen acids, and hydrogen compounds.

Selenium Dioxide, SeO₂, a white crystalline compound formed when selenium is burned or by heating selenious acid. It dissolves readily in water forming selenious acid.

Selenious Acid, H₂SeO₃, a crystalline solid found by oxidation of selenium in presence of water, or as above. It is a di-basic acid forming salts called selenites having the general formula M₂SeO₃.

Selenic Acid, H₂SeO₄, a heavy liquid resembling sulphuric acid and formed by action of powerful oxidizing agents on selenium or selenious acid. It differs from sulphuric acid in being unstable, losing its oxygen readily and thereby passing to selenious acid. Also a di-basic acid forming salts called selenates (M₂SeO₄).

With hydrogen selenium forms a very disagreeable smelling gas called seleniuretted hydrogen (H₂Se), the analogue of sulphuretted hydrogen. Selenium forms compounds with many metallic elements (see above) called selenides.

SELENODONT TEETH — SELF DEFENSE

These are analogous to the sulphides and usually occur along with them. They may also be made by heating selenium with the metal.

Selenodont Teeth, a type of molar teeth, characteristic of modern herbivorous animals, on which the crown of the tooth exhibits curving ridges of enamel instead of rounded tubercles. Compare **BUNODONT**.

Selen'sul'phur, an orange- to brownish-red mineral consisting of sulphur and selenium. It is a result of volcanic action, and occurs as an incrustation in the islands of Lipari, Vulcano, Hawaii and Japan. The name is often improperly applied to orange-yellow crystals of native sulphur from Sicily.

Seleucia, sēl-ū'sī-ā, Asia, the name of several cities founded by Seleucus Nicator. (1) The most celebrated was Seleucia-on-the-Tigris, made the capital of Babylonia in place of Babylon, from which it was distant about 30 miles, and which it eclipsed in wealth and splendor. The Tigris and Euphrates flowed near its walls, and rendered it one of the richest commercial cities of ancient times. The number of its inhabitants at the time of its greatest prosperity is estimated to have been about 600,000, chiefly Greeks. During the decline of the Seleucid monarchy it became independent, and from its great wealth became the centre of attraction to the pillaging tribes of southern Armenia and Media, by whom it was partially plundered several times. In 116 A.D. it was burned by Trajan, and a few years later its destruction was completed by Lucius Verus, the Roman emperor. From that time it was deserted, and became as desolate as Babylon itself. (2) Another important city, Seleucia Pieria, founded in 300 B.C., was situated on the sea-coast at the foot of Mount Pieria, 12 miles west of Antioch. Its natural strength was improved by every known art of fortification, and this combined with its magnificent buildings obtained for it a distinguished position among the great cities of antiquity. It occupied a very prominent place in the wars between the Seleucidæ and the Ptolemies, but it rapidly declined under the Roman dominion, and in the 6th century of our era the city had fallen into complete decay.

Among the other cities of the name were a Seleucia in Syria, and one in Cilicia.

Selen'ciana. See **RELIGIOUS SECTS**.

Seleucidæ, sē-lū'sī'dē, the descendants of Seleucus, a dynasty of kings who succeeded to that portion of the empire of Alexander the Great which embraced the eastern provinces, Syria, and a considerable part of Asia Minor.

SELEUCUS I., surnamed Nicator, one of the diadochi or successors to the divided empire of Alexander, b. 365; d. 281 B.C. His father Antiochus was a general of Philip's, and he himself was one of the most distinguished officers of Alexander the Great, who invested him with the government of Babylonia and Media. On the death of Alexander in 323 Seleucus joined the conspiracy against Perdiccas, which resulted in the death of the latter, and in the second division of Alexander's dominions the satrapy of Babylon fell to his share. Like the other generals of Alexander, he asserted his independence, and this step being opposed by Eumenes, he obtained the aid of Antigonus against him. Their united efforts proved suc-

cessful, but Antigonus now turned upon Seleucus himself, who, rather than face him, withdrew to Egypt (316 B.C.). Two or three years later he succeeded in inducing Ptolemy, the governor of Egypt, along with Lysimachus and Cassander, to take the field against their common enemy Antigonus, now grown very powerful. Their forces proving victorious, he assumed the title of king of a vast dominion extending from the Euphrates to the Indus (306.) After a final victory over Antigonus, the whole of Syria and a great part of Asia Minor fell to the share of Seleucus. By subsequent victories over Lysimachus and Demetrius his possessions were extended so as to include the whole of Asia Minor. He was assassinated by Ptolemy Ceraunus. He was the protector of the arts and sciences, the benefactor of his people, and the most upright of Alexander's successors. Besides several cities of the name of Seleucia, he likewise founded Antioch. He was succeeded by his son Antiochus I. (See **ANTIOCHUS**).—**SELEUCUS II.**, surnamed Callinicus, succeeded his father Antiochus II. in 246. He murdered his step-mother Berenice, and Ptolemy Euergetes, her brother, invaded the territories of Seleucus to avenge her death, but eventually concluded truce with his foe, and retired. After this Seleucus with varying success engaged in contests with his brother Antiochus Hierax, Tiridatus, king of the Parthians, then with Ptolemy, who had broken the truce. In an expedition, however, against the Parthians he was defeated by Arsaces I., king of Bactria. He died in 226 B.C., having reigned 20 years, and was succeeded by his son Seleucus III., who only reigned three years, being followed by Antiochus III., surnamed the Great.—**SELEUCUS IV.**, surnamed Philopator, succeeded his father Antiochus III. in 186. Syria had been greatly weakened by the war carried on by Antiochus against the Romans, and Seleucus had to pay immense sums to the victors. His reign was signalized by few events of importance, and after he had been 12 years on the throne he perished from poison (175).—**ANTIOCHUS IV.**, surnamed Epiphanes, succeeded him, and is notorious for his cruel persecution of the Jews, whose religion he attempted to extirpate.

The power of the Seleucidæ began to decline as early as the reign of Seleucus II., and they successively lost, through revolts and otherwise, Bactria, Parthia, Armenia, Judæa, and what subsequently remained was converted into a Roman province in 65 B.C.

Self Defense is the right to protect one's person or property from injury. The law further sanctions the mutual and reciprocal defense of those who stand in the near relation of husband and wife, parent and child, and if when himself, or any of these relations be forcibly attacked in person or property, it is lawful to repel force by force, for the law in such cases respects the passions of the human mind and permits one to employ immediate justice, prompted by nature, which prudential motives are not strong enough to restrain. The law of self defense is founded on necessity, and one in order to avail himself of this defense must show belief, and the reason to believe, that there was imminent danger to life, or of receiving bodily harm, and that as a reasonable person no other means of defense would be effectual; the danger must be appar-

SELF-DENYING ORDINANCE — SELIGMAN

ent and imminent and either existing at the very time, or reasonably believed to be so. Threats alone do not justify or excuse homicide; there must be some actual demonstration of an intent to take life, or inflict bodily harm in order to establish self defense. In cases of mere assault it is generally held that the right of self defense does not arise until reasonable effort has been made for protection. One who is in legal possession of property has the right to defend the same against one who manifestly intends or endeavors by violence to commit a felony, and may in such defense kill his adversary. An officer of the law authorized to make an arrest has the right to use necessary force, and if the person whom he is attempting to arrest, by resistance, brings violence upon himself, this cannot be made to justify the killing of an officer.

In many of our States the principles of law respecting right of self defense is the subject of statutes.

Self-denying Ordinance, in English history a measure carried through the British Parliament in 1645 by the influence of Cromwell and the Independents, by means of which generals who were either less efficient or but half-hearted in the cause were removed from the command of the army. After Manchester's lack of energy at the second battle of Newbury (October 1645), Cromwell had determined on a change of tactics, and attacked Manchester in Parliament, but he soon found the more sweeping measure a better means toward his ends. The lords threw out the measure, whereupon the Commons proceeded to form a new army under Sir Thomas Fairfax as general-in-chief. The lords now passed the measure with some alterations and called on all existing officers to resign. Thus Essex, Waller, and Manchester were got rid of, while Cromwell was specially reappointed to the command of the cavalry as lieutenant-general. For a similar measure, but one suicidal to good government, in the history of the French Revolution, see *MIRABEAU*; *ROBESPIERRE*.

Self Help, a noted book by Samuel Smiles, published in 1859 and still popular. It is a stimulating book for young people, and abounds in anecdotes of various men, inventors, scientists, artists, soldiers, clergymen, and statesmen who have made their way in the world. The various chapters are concerned with national and individual self help; application and perseverance; helps and opportunities; industry, energy and courage; business qualities; money, its use and abuse; self-culture; and character.

Selfridge, Thomas Oliver, American naval officer: b. Boston, Mass., 24 April 1804; d. Waverly, Mass., 15 Oct. 1902. He entered the navy in 1818 as a midshipman and in 1827 was commissioned lieutenant. He was in command of the Dale during the Mexican War, and was present at the capture of Matanzas and Guaymas. In 1861 he took charge of the frigate Mississippi of the Gulf Squadron, but an old wound forced him to retire from sea service. He was made commandant of the navy yard at Mare Island, California, and was president of the Examining Board. He was retired in 1866.

Selfridge, Thomas Oliver, Jr., American naval officer, son of the preceding: b. Charlestown, Mass., 6 Feb. 1836. He was graduated

from the United States Naval Academy 1854, and six years later was promoted lieutenant. During the Civil War he was on board of the Cumberland when she was sunk by the Merrimac, and commanded the Cairo, an ironclad, which was blown up in Yazoo River. He had command of a battery at the capture of Vicksburg and was in both attacks on Fort Fisher. In 1869 he was promoted to commander, and superintended the surveys for the inter-oceanic canal across the Isthmus of Darien. He was a member of the International congress at Paris 1876 and became rear-admiral in 1896 and was retired 6 Feb. 1898.

Seligman, sē'lig-man, Edwin Robert Anderson, American political economist: b. New York 25 April 1861. He was graduated from Columbia in 1879, studied three years abroad and on his return became prize lecturer in political economy at Columbia in 1885. He was adjunct professor of political economy there 1888-91, and has been full professor since that date. He has been associated with social reform movements, is president of the Tenement House Building Company, was long connected with the Educational Alliance, and is an industrial writer on financial and economic questions. Besides editing 'The Political Science Quarterly,' he has published 'Railway Tariffs' (1887); 'Two Chapters on the Mediæval Guilds of England' (1887); 'Progressive Taxation in Theory and Practice' (1894); 'The Shifting and Incidence of Taxation' (1899); 'Essays on Taxation' (1900); 'Economic Interpretation of History.'

Seligman, Jesse, American banker: b. Bayersdorf, Bavaria, 1825; d. Coronado Beach, Cal., 23 April 1894. He emigrated to America in 1840, and after joining his brothers in business for a few years went in 1849 to California where he amassed a fortune in legitimate business during the early years of the mining fever. Removing to New York, and entering the firm of J. & W. Seligman & Co., he was soon recognized as one of the leaders in finance. He was president of the Hebrew Orphan Asylum of New York for many years, and his name was associated with civic and educational movements.

Seligman, Joseph, American financier: b. Bayersdorf, Bavaria, 22 Sept. 1809; d. New Orleans 25 April 1880. The eldest of eight brothers, all of them later to be united in a banking firm, with branches throughout the world, his attention was first directed to medicine and theology, but his tastes soon developed in other lines. In his 17th year he came to America and entered the employ of Asa Packer (q.v.) in Pennsylvania as cashier. He went next to Greensboro, Ala., where he opened a store, his success encouraging two of his brothers to settle in Watertown, N. Y., about 1841. In 1848, the rest of his family having emigrated, he removed to New York and organized with them an importing house which was soon among the most prominent in its line. When the Civil War began, the Seligmans established the banking firm of J. & W. Seligman & Co., with branches in London, Paris, Frankfurt, and San Francisco, each in charge of one of the brothers. Joseph was offered the secretaryship of the treasury by President Grant, who felt entire confidence in his financial ability and patriotism, which had already done so much to maintain the national credit.

SELIM—SELJUKS

Selim I., sē'lim or sē-lēm', sultan of Turkey: b. about 1465; d. Constantinople, 22 Sept. 1520. He was the son of Bajazet II., whom he succeeded in 1512 and subsequently poisoned. To secure himself on the throne he murdered his two brothers Ahmed and Korchud, and likewise his nephews, after massacring about 40,000 Shiites in order to rid his country of a Mohammedan sect to which he was inimical. He went no further, however, than the conquest of Diarbekir and Kurdistan. He next made war against the Mamelukes of Egypt, and in 1516 obtained a victory which left him master of Syria. Following up his victory by marching against Touman Bey, he routed the Mamelukes in the plains of Gaza, and of Rudania in the following year, and then entered Cairo without opposition. Touman Bey and many others were put to death, and Egypt, which had been an independent empire since the time of the Crusades, was incorporated with the Ottoman Empire. The title of *iman* and the standard of the Prophet were at this time granted to Selim by the last descendant of the Abassides, who at that time was residing in Egypt, and in consequence of this concession the sultans of Constantinople became the chiefs of Islam, the representatives of Mohammed. Owing to this proceeding Arabia acknowledged his supremacy. He was succeeded on the throne by Solymán I.

Selim II., sultan of Turkey: d. 12 Dec. 1574. He succeeded his father Solymán II. in 1566. The chief events of his reign were his capture of Cyprus from the Venetians in 1570 and Tunis from the Spaniards in 1571. In that year occurred the great naval battle of Lepanto in which he suffered defeat at the hands of the combined Spanish and Italian fleets.

Selim III., sultan of Turkey: b. 14 Dec. 1761; d. 8 May 1808. He succeeded his uncle Abdul-Hamed I., at which time a war was in progress with Austria and Russia. The Turks were defeated, and in 1791 Selim was compelled to cede Choczim to Austria, and in the following year he signed the Peace of Jassi, which required the surrender to Russia of all Turkish possessions beyond the Dniester. He formed an alliance with Russia and England at the time of the French expedition into Egypt in 1798. Egypt was restored to Turkey by England after a temporary loss and peace was concluded with France in 1802. Selim now entered with great ardor upon a system of reforms; he established cannon foundries, and organized a corps of troops, which he armed, clothed, and exercised in European fashion. This proceeding, however, was looked upon with jealousy by the people who burst into open revolt in 1807. The attempts to quell the rebellion were unavailing; the rebels marched upon Constantinople, and compelled Selim to yield the throne to his cousin Mustapha IV. An attempt afterward made by Mustapha-Baraiktár to reinstate Selim ended in failure, and he died by assassination.

Selinus, sē-lí'nūs, Sicily, an ancient Greek colony, founded probably about 628 B.C. on the southwest coast of the island. Its great power and wealth, and the rich treasures of its temples are mentioned by Thucydides. It was conquered by the Carthaginians in 409 B.C. and in 249 B.C. destroyed by them. There are still im-

portant ruins of ancient Greek temples here, and valuable sculptures belonging to them have been preserved.

Selish Indians. See SALISHAN INDIANS.

Seljuks, sēl-jooks', a Turkish family which derived its name from Seljuk, the chief of a small tribe of the Hoei-He, which had gained possession of Bokhara and the surrounding country in the 9th century of our era. During the 11th and 12th centuries the Seljuks founded various dynasties in Mesopotamia, Persia, Syria, and Asia Minor. Among the most distinguished of these were the following: (1) The *Seljuks of Iran* or Bagdad, who ruled at Bagdad and Ispahan. This dynasty was the most powerful of them all, and boasted the most illustrious princes. The founder was Togrul Beg, a grandson of Seljuk, who in 1038 made himself master of Khorassan, a Persian province, assumed the title of sultan, and obtained from the Caliph of Bagdad, whose daughter he married, the dignity of governor-general or *emir-al-omrah*. He subsequently completed the conquest of Persia by the reduction of Irak-Arabi and Mosul about 1061. He died in 1063, and of his successors may be mentioned Alp-Arslan (1063-73), who vanquished and made prisoner the Greek emperor Romanus; Melek-Shah (1073-93), who was the most powerful prince of the dynasty, and by means of his generals conquered and annexed to his empire Arabia, Asia Minor, Armenia, Syria, and Palestine, and in the administration of the empire was signally aided by his minister Misam-el-Moulek, who was distinguished for the wisdom and moderation with which he regulated the affairs of the vast empire, and for the encouragement he gave to the arts and sciences; Mohammed-Shah (1105-18), who carried on successful wars in India and against the Crusaders; and Sanjar, who reigned from 1118 to 1158, and was one of the most illustrious of the Mohammedan princes. This dynasty became extinct in 1194 with Togrul-Shah, who was vanquished by Tekesh, sultan of Kharizm. (2) The *Seljuks of Kerman*, who ruled in the three provinces of Kerman, and never acquired the same distinction as the preceding. Founded by Kaderd, a nephew of Togrul-Beg, to whom the latter in 1039 confided the administration of these provinces. The dynasty subsisted till 1091. (3) The *Seljuks of Aleppo*, in Syria, founded in 1079 by Tutush, a brother of Melek-Shah, and to whom the latter entrusted the administration of Syria. This dynasty became extinct in 1114. (4) The *Seljuks of Damascus*, in Syria, founded in 1096 by Dekkak, a son of Tutush, who possessed himself of the city of Damascus, and whose successors reigned till 1155. (5) The *Seljuks of Iconium*, or of Asia Minor, founded by Soliman-ben-Kutulmish, one of the great-grandsons of Seljuk, to whom the Sultan Kalek-Shah granted a territory in Asia Minor. This was the longest lived of all the Seljuk dynasties. Under the reign of Alladed-Din II., one of the last princes of the dynasty, the Turk Osman distinguished himself as chief captain. His descendants it was who founded the dynasty of Osman in Asia Minor. The whole of the extensive empire of the Seljuks now fell under Mongol domination. Consult also Mirchond's 'History of the Seljuks,' which

SELKIRK—SELOUS

has been translated from Persian into German (Giessen 1838).

Selkirk, sél'kérk, **Alexander**, Scottish sailor: b. 1676; d. 1721. In May 1703 he joined Dampier's privateering expedition to the South Seas, and sailed as master in the *Cinque Ports* under Captain Stradling. In consequence of some difference with his commander he was put ashore on the island of Juan Fernandez (Más-a-Tierra) off the Chilean coast, and remained in his solitude till he was taken away by Captain Woods Rogers, in January 1709. Some account of his residence was published by Steele in the 'Englishman' (No. 26; 3 Dec. 1713), in Rogers' 'Voyage Round the World' (1712), and in Cooke's 'Voyage to the South Sea and Round the World' (1712); but there is no reason to believe that he had any papers or journal of any sort. He is known as the prototype of the 'Robinson Crusoe' (1719) of Daniel Defoe (q.v.), who apparently derived such information as he had from Steele, Rogers, and Cooke. Little of the details of the famous narrative, however, is derived from Selkirk's adventure. Consult: Howell, 'Life and Adventures of Alexander Selkirk' (1829); Sutcliffe, 'Crusonia' (1843); Wright, 'Life of Defoe' (1894).

Selkirk, Thomas Douglas, 5th EARL OF: b. Kirkcudbrightshire, Scotland, June 1771; d. Pau, France, 8 April 1820. He was educated at Edinburgh University, and in 1799 succeeded his father in the earldom. He was active in the promotion of the emigration movement to the Red River and the colony established there was known as the Earl of Selkirk's Settlement. He published 'Sketches of the British Fur Trade' (1816); 'The Red River Settlement' (1817).

Selkirk Mountains, a range of the Rocky Mountains, in British Columbia, from about latitude 52° to 48° N. The Columbia River is on the eastern side for some distance, and the Canadian Pacific Railroad crosses the range between the peaks Sir Donald and Glacier House at an altitude of 4,300 feet.

Sellers, sél'érz, **Coleman**, American engineer: b. Philadelphia, Pa., 28 Jan. 1827; d. 28 Dec. 1907. He obtained a degree at Stevens Technological Institute and was professor of engineering practice there from 1886. He was chief engineer of the Niagara Falls Power Company, and chief mechanical engineer of the Canadian Niagara Power Company. He made numerous inventions in mechanical appliances, was a member of many American and foreign scientific societies, and was widely known as a consulting engineer.

Sellers, Col. Mulberry, the name of a character in the novel, 'The Guilded Age,' by Mark Twain and Charles Dudley Warner. He was a visionary southern speculator, and was created on the stage by John T. Raymond.

Sel'lew, Walter Ashbel, American Free Methodist bishop: b. Gowanda, N. Y., 27 Feb. 1844. He was graduated from Dartmouth College in 1866, entered the ministry of the Free Methodist Church in 1872 and from 1887-98 was presiding elder. He has been bishop since the year last named, and is president and treasurer of the A. M. Chesbrough Seminary at Chili, N. Y.

Sellstedt, sél'stét, **Lars Gustaf**, American painter: b. Sundsvall, Sweden, 30 April 1819. He went to the United States in 1834, and subsequently served in the United States navy. After settling in Buffalo 1842, he devoted himself to the study of art, and in 1875 was elected a National Academician.

Selma, sél'ma, Ala., city, county-seat of Dallas County; on the Alabama River, at the head of steamboat navigation, and on the Louisville & N., the Birmingham, S. & N. O., the Southern, and the Western R. of A. R.R.'s; about 50 miles west of Montgomery and 158 miles northeast of Mobile. It has steamer connections with Mobile and other ports. It is in an agricultural region in which cotton is one of the chief products. During the Civil War the city was the centre of military operations; it had a Confederate navy-yard, arsenal, powder-works, and artillery-foundries. The place was captured by the Union forces 2 April 1865.

The principal industrial establishments are railroad machine shops, cottonseed-oil mill, planing mill, car-wheel shops, cotton factories, cotton warehouse, iron works. The city has a large trade in cotton and lumber products, coal, and in iron products.

The educational establishments are the Selma University (Baptist), opened in 1878, for colored pupils, Dallas Academy, public and parish elementary schools, Young Men's Christian Association library and reading room, and private business schools. The three banks, one national and two state, have a combined capital of \$750,000. Pop. (1910) 13,649.

Selma (Ala.), Battle of, an engagement of the Civil War, 2 April 1865, one of the battles of Gen. Wilson's cavalry raid in the operations against Mobile. The Union cavalry camped at a point 19 miles north of Selma on 1 April, and on the morning of the next day began the movement against the town. One division advanced from the north on the Summerville road, and a second division from the northeast on the Burnsville road, while a third division was despatched to burn railroad bridges, trestles, stations, etc., as far as Burnsville. The troops were in position before Selma by 4 P.M. and, dismounting, assaulted and carried the works at a single charge, the distance over which they charged, exposed to the enemy's fire, being 600 yards. The Selma fortifications consisted of a bastion-line with a radius of three miles; the Confederate force on the line against which the charge was made was over 1,500; the Union force engaged numbered 1,550. The Federals captured 31 field-guns, a large number of prisoners and quantities of stores of all kinds. Consult: 'Battles and Leaders of the Civil War,' Vol. IV.

Selous, sè-loos', **Frederick Courtney**, English traveler: b. London, England, 31 Dec. 1851. He was educated at Rugby, and at Wiesbaden and other places on the Continent. In 1871 he went on his first journey to South Africa and traveled there from that time until 1892. He entered the service of the British South Africa Company in 1890 and conducted the expedition which resulted in the occupation of Mashonaland. He visited England in 1892 but returned to Africa to take part in the

Matabele wars of 1893 and 1896. He has published: 'A Hunter's Wanderings in Africa' (1881); 'Sunshine and Storm in Rhodesia' (1896); 'Sport and Travel, East and West' (1900); etc.

Selwyn, sĕl'wĭn, Alfred Richard Cecil, Canadian geologist: b. Kilmington, Somerset, England, 28 July 1824. In 1845 he was appointed assistant on the geological survey of Great Britain, and in 1852 director of the survey of Victoria, Australia, which was not completed until 1869, when he was appointed director of the Canadian survey, completed in 1895. He also investigated the coal and gold fields of Tasmania in southern Australia in 1854-9. He is a fellow of the Royal Society. His writings include, beside some odd volumes of reports of geologic and natural history survey, portions of Stanford's 'Compendium of Geography and Travel.'

Selwyn, George Augustus, English wit and politician: b. Gloucestershire 11 Aug. 1719; d. London 25 Jan. 1791. He was educated at Eton and Oxford, but quitted Oxford in bad odor before graduating on account of a reputed insult to the Christian religion. He was appointed to several offices at the mint involving no work and bringing him a small salary. In 1747 he entered Parliament for Ludgershall, and from 1754 to 1780 sat for the city of Gloucester. He never spoke at Parliament, but his vote being always cast with the court party secured him lucrative appointments. He was a famous wit at the clubs, and an intimate of the Duke of Queensbury, Horace Walpole, and Lord Carlisle. Consult Jesse, 'George Selwyn and his Contemporaries' (1843).

Selwyn, George Augustus, English bishop: b. 5 April 1809; d. Lichfield 11 April 1878. He was educated at Eton and at Cambridge; rowed in the first inter-university boat race (1829). His remarkable powers as an athlete were found very serviceable in after life. In 1841, he was consecrated bishop of New Zealand and Melanesia, a territory since then divided into seven dioceses. On the voyage out he studied Maori and navigation, and in his own vessel visited every portion of his diocese before setting about the work of organizing it. A visit to England in 1854 brought back John Coleridge Patterson, afterward bishop of Melanesia, where he was murdered by the natives. In 1867 Bishop Selwyn attended the first Pan-Anglican Synod at Lambeth, and was appointed bishop of Lichfield. He was present at the General Convention of the American Episcopal Church at Baltimore in 1871.

Selwyn College, Cambridge, England, founded in 1882 in memory of George Augustus Selwyn, bishop of Lichfield, is an institution meeting the requirements of Anglican theological students, on a more economical basis than those of the older established colleges.

Sem'aphore, a term originally applied to a signaling post in a system of coast telegraphy adopted by the French in 1803, and subsequently to any kind of signaling posts having arms moving round pivots placed at or near their extremities. The semaphore, from the ease and rapidity with which the movable arms could be worked, was much superior to any telegraph

previously in use. The French semaphores consisted of upright posts with two or three movable arms, turning upon separate pivots, one above the other. Like other telegraphs previously in use these were mounted on the top of towers, erected in commanding positions, at the distance of from 5 to 10 miles apart. When signals were made at one tower they were read off at the next by means of a powerful telescope, and then transmitted to a third, and so on if necessary, to the end of the series. In this way a message might be despatched with great rapidity. In 1809 Captain Pasley, an English officer who had previously constructed what he termed a polygrammatic telegraph, saw the French semaphore, and applied the principle of it to his own telegraph. As thus modified, it consisted of a vertical post with three opposite pairs of arms pivoted upon it at certain intervals, representing hundreds, tens, and units. Till 1816 the British admiralty had employed a telegraph which had been submitted in 1795 by Lord George Murray, and which consisted of several shutters placed in a vertical frame, by the opening and closing of which the signals were made. In the year named it was determined to substitute for these telegraphs semaphores constructed on the principle of those used in France, with certain improvements suggested by Sir Home Popham. In Popham's semaphore there were only two arms; but these being upon separate pivots, though on the same post, each of them could be made to assume six different positions, and in combination the two could give 48 signals, a number more than sufficient to express all the letters of the alphabet, together with the nine digits. The vertical post of this semaphore was a hollow hexagonal mast, which passed through the roof of the tower, and being fixed upon a pivot it could be made to turn so as to display its signals in any direction. It was not till the introduction of the electric telegraph that government semaphore stations were abandoned. A kind of semaphore is still in use on railways, and in ships, when the weather does not allow of flags being worked as signals. See RAILWAY SIGNALS.

Sembrich, zĕm'brĭn, Marcella, Austrian opera singer: b. Lemberg, Galicia, 15 Feb. 1858. She studied violin and piano at first; her master on the latter instrument being Franz Liszt. When it was discovered that she had a remarkable voice she went to Milan to study with Lamperti, and made her first appearance at Athens in 'I Puritani.' Shortly afterward she became attached to the company of the Royal Opera House, Dresden, and remained until 1880. That year she appeared first in London. She came to the United States in 1883, since which time she has reappeared here in several seasons of concerts and opera. In 1903-4 she was the leading coloratura soprano at the Metropolitan Opera House. Her repertory embraces a wide range of the Italian operas.

Semecarpus, a genus of trees of the *Anacardiaceæ*, containing about 40 species, and indigenous to the East Indies. The leaves are alternate and coriaceous, and the small flowers having sepals, petals, and stamens in fives, three styles, and a one-celled ovary, are borne in bracted terminal or lateral panicles. The fruits are kidney-shaped nuts on a thickened pedicel,

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with a hard, thick, resinous pericarp. The marking-nut tree (*S. anacardium*) is the most important species. The pericarp of its fruit furnishes a juice which is greatly used in India for marking clothes, for ink and for a dye; it is also employed for warding off white ants and for a medicine in rheumatism, warts and leprosy; and when pounded and boiled in rape-seed oil, stays putrefaction when started in hides. The seed itself, which is called oriental cashew-nut or malacca bean, and the fleshy pedicel are eaten by the natives. The resin of this species yields the varnish of Sylhet, and an oil derived from it mixed with the milk of euphorbia is made into birdlime. *S. panduratus* also abounds in caustic black juice.

Semele, sēm'ē-lē, according to Greek mythology, the mother by Zeus of Dionysus, or Bacchus, the god of wine.

Semerara, sā-mā-rā'rā. (1) A group of islands of the Philippine Archipelago lying to miles south of Mindoro, in the channel between Mindoro and Panay. The group consists of eight islands and a number of small islets; area 60 square miles. The people are Visayans, and are mostly engaged in turtle and trepang fishing. Pop. 500. (2) The largest island of this group; area, 35 square miles. It is hilly, the highest elevation being 512 feet. The west coast is indented with several bays, but none afford good anchorage; there is sheltered anchorage to the south of the island during the northeast monsoon. Coal of good quality is found, especially in the north.

Semi-automatic Guns. See ORDNANCE.

Semi-Pelagianism. See PELAGIANISM.

Seminole (sēm'ī-nōl) **Indians** (Creek Sim-anoli, "separatist," "renegade"). An important tribe of the Muskogean stock of American Indians. The name was originally applied to those Creeks and Hitchitis on lower Chattahoochee River who left the main body about 1762-8 and removed to the peninsula of Florida, in the territory that had been occupied by the Appalachians who were practically exterminated some 60 years before, although some Creeks, who later became part of the "Seminoles" have resided in the southern part of Florida since the middle of the 16th century. The separation of the Creeks and Hitchitis from their northern kinsmen was due chiefly to over-population of the older towns, followed by turbulent and undesirable elements, criminals and desperadoes (whence the opprobrious application of the term Lemicea by the Creeks who remained at home, and the forcible migration of others owing to the encroachments of civilization. The Hitchiti element consisted principally of Mikasukis; there were also probably some Yamasis, and certainly some Yuchis and negroes. The Seminoles are known to history chiefly through their two wars with the United States—the first in 1817-18, provoked by the upper Creeks, the other in 1835-42, which was the bloodiest and most furiously contested struggle with Indians in which the government has ever engaged, resulting from the refusal of a part of the Indians to remove to the Indian Territory under the provisions of a treaty agreed to by them in 1834, in which they ceded their lands in Florida to the United States. On the final surrender of the hostiles, in 1842-3,

the Seminoles (with the exception of some who fled to the swamps) to the number of 3,824, were moved to the West, where they now form one of the five civilized tribes of the Indian Territory, the others being the Cherokees, Choctaws, Chickasaws, and Creeks. The Seminoles in Indian Territory number 2,757 (including some negroes and adopted whites); they have their own government and manage their own tribal affairs. The 358 Seminoles still in Florida, although not under governmental control, are partly civilized and are entirely inoffensive; they subsist by agriculture and by hunting and fishing.

Seminole War, the second of the two wars in which the Seminole Indians of Florida engaged against the United States, the first having been a short conflict in 1817-18, which was ended by Gen. Jackson, who destroyed villages of the Indians and wholly subdued them. The second, which is that usually referred to as the Seminole war, began in 1835 and ended in 1842, and was the fiercest of all wars waged by the United States against Indians. It began in consequence of the refusal of a part of the tribe to make a cession of its lands in Florida and submit to removal to the Indian Territory, in accordance with the terms of a treaty ratified in 1834. On the Indian side the war was at first conducted by the celebrated chief Osceola (q.v.), with whose name it is largely associated; and on the part of the United States it was carried on by Scott, Taylor, Jesup, and other commanders. After a protracted struggle the Indians were completely subjugated, and in 1843 about 4,000 of them were removed, those who arrived in the Indian Territory forming one of the five civilized nations now located there.

Semipalatinsk, sēm-mē-pā-lā-tīnsk', or **Semipolatsinsk**, Asia, in Siberia, (1) Capital of a province of the same name, situated on the left bank of the Irtysh River. It is fortified and the chief points of interest are the government buildings, offices, mosques, churches, bazaars and barracks. There is considerable trade with Kirghiz, Tashkend, Khokand, Bokhara, and Kashgar.

(2) The province of Semipalatinsk covers an area of 178,128 square miles. The Alexandrian Mountains separate it from Turkestan on the south. Several other ranges traverse its territory. The principal streams are the Irtysh, Ili, and Chui. The lakes: Issik-Kul, Ala-Kul, and Balkash. Cattle raising forms the only industry of the inhabitants. Some lead and copper, etc., occur. Its climate is comparatively mild. Apricots and apples are spontaneous. Pop. about 690,000.

Semipal'mated Sandpiper. See SANDPIPER.

Semiramis, sēm-mīr'a-mīs, a fabulous queen of Assyria. She was a daughter of the fish-goddess Derceto of Ascalon, in Syria, by a Syrian youth. Being exposed by her mother, she was miraculously fed by doves until discovered by the royal shepherds, the chief of whom, Simmas, took her to his own house and brought her up. Her surpassing beauty according to Ctesias, having attracted the notice of Onnes, the governor of Nineveh, he married her. She subsequently accompanied her husband to

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the siege of Bactra, where, by her advice she assisted the king's operations. Captivated by her abilities as well as by her beauty, Ninus, the founder of Nineveh, asked her of her husband, who refused to yield her, and when Ninus added threats to entreaties hanged himself. As queen of Assyria, Semiramis built Babylon, adding fine buildings and hanging gardens. She led campaigns against Persia, Egypt, Libya and Ethiopia. Finally with a host of 3,000,000 foot, 500,000 horse and 100,000 war-chariots she engaged in battle with King Stabrobates and was defeated in a battle on the Indus with the loss of one third of her forces. Upon this it is said she vanished in the shape of a dove or slew herself. Evidently she has no existence in history. She is the goddess of war and of love, the Istar of the Assyrians, to whom the dove was sacred. Consult Lenormant, 'La Légende de Semiramis' (1873).

Semites, a name given by J. G. Eichhorn in 1787 to a group of nations closely allied in language, religion, manners, and physical features, who are represented in Gen. x. as descended chiefly from Shem, a son of Noah. Their habitat is Abyssinia, Arabia, Palestine, Phœnicia, Syria, and the countries of the Euphrates and Tigris. Into those lands, according to one theory which is supported by Lenormant and others, there had preceded them an immigration of Cushites of the Hamitic race, who, proceeding from Central Asia, occupied not only the lands that afterward became Semitic, but also the Nile Valley. Their Hamitic language and civilization, the Semites are said to have adopted. In language the Semites do show some affinity with the Berbers and the inhabitants of the Nile Valley, and Gen. x. does, for political and geographical or other reasons, distribute the sons of Ham and Shem in a peculiar manner. But the increasingly prevalent theory is that not less than 4,000 years B.C. the Semites migrated as nomadic tribes, probably from Arabia, into Mesopotamia. There they found a Turanian population dwelling in cities built of brick, under the regular government of priest kings, skilled in the use of metals, using the cuneiform mode of writing, and comparatively far advanced in literature and culture. The hold of the Semites on Shumir, the lower, more fertile, and more thickly inhabited part of the Euphrates Valley, was not at first so strong as on Accad, the upper part. In 3,800 B.C. the Semitic adventurer Sharrukin usurped the kingdom of Accad. In Elam also the Turanian population was early overpowered by the intruding Semites, who came to form the upper strata of society. In 2280 B.C. the Semite Khudur-Nankhundi of Elam invaded and conquered Shumir and Accad, founding the Elamite line of princes; and about 2200 B.C. one of his successors, Khudur-Lagamar (Chederlaomer), carried his conquests as far as Palestine (Gen. xiv.).

These painful and oppressive impulses, and probably others like them, seem to have occasioned emigrations of many Semites. Some proceeded toward the northwest, reached the Mediterranean Sea, founded Sidon, Tyre, and other cities, and became known afterward as Canaanites or Phœnicians. Later, from Ur went others in the same direction, settled behind the Phœnicians, and were afterward known as Israel.

Others went north and built cities which developed into the empire of Assyria. While the Semites were in Mesopotamia they used the Turanian language in their public documents till they attained the ascendant in political power; and when afterward they used their own language they continued to use the Turanian cuneiform mode of writing. The Turanian religion also was adopted by the Semites, and mixed with what religion their own primeval tribal religion or totemism had developed into. This amalgamation was consummated by Sharrukin II. of Accad about 2000 B.C.

The Semites as a race have a fine physical organization, are mentally quick, clever, but not inclined to change, and not persistent in progress. They have been distinguished by a brilliant imagination and love of the beautiful; but have not shone in philosophy or in science. Their literature has neither epic nor dramatic poetry worth notice. Almost their only arts are the sculpture of Assyria, the exquisite glass and pottery, and the textile fabrics and embroidery of the Phœnicians. Impatient of restraint, the Semites have not by political aptitude welded together themselves or others into large, compact, and enduring commonwealths. They have made their mark on the world in the Phœnician commerce, which visited even the Atlantic shores of Spain and France and drew tin from Britain; in the Phœnician colonies, which, dotting all the coasts and many islands of the Mediterranean Sea as far as Cadiz, and the coast of Asia as far as India, dispensed manufactures, developed primitive navigation (even to the extent of circumnavigating Africa more than 2,000 years before Vasco da Gama), stimulated industry, trade, and ingenuity, and radiated the light of material civilization; in the Carthaginian empire within Europe and Africa; in the exploits of Hannibal; in the dissemination of alphabetic writing, whereof the Phœnician form was the mother of the European and of most Asiatic alphabets, while the alphabet of the great Sabæan kingdom, or of the great and still more ancient Minæan kingdom in Arabia, is apparently the oldest of all alphabets hitherto discovered; in the Babylonian and Assyrian empires; in the Hebrew Bible and the Jewish religion; in the New Testament and the Christian religion; in the Koran and the Mohammedan religion; in the Mohammedan conquests and empire; and in the preservation of culture thereby during the Dark Ages and the Middle Ages.

Semitic Languages, the languages spoken by the nations of whom Shem was considered the common ancestor. The word Semitic comes from the Septuagint form of the name Shem, Shemitic, derived directly from the Hebrew, being much less frequent. The Semitic languages form a group somewhat like the Aryan group, although the relationship of the different languages is much closer. The members of the group do not entirely correspond to the list of the descendants of Shem given in Gen. x. 21-31; Elam, for example, which is included, in x. 22, was not a Semitic people, while the Canaanites, including the Sidonians, who were Semitic, are given in x. 15 among the descendants of Ham. Such facts indicate that the table of nations in Gen. x. was not entirely ethnological, but at least partly geographical: the nations were grouped

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according to their geographical distribution in the time of the writer.

General Divisions.—The Semitic languages are often divided into two main divisions, Northern and Southern. But the former can be divided into three groups, Eastern, Northern, and Middle, which are separated from each other by differences very nearly as great as those between the two divisions first mentioned. It seems better, therefore, to recognize the general division as fourfold, into Eastern, Northern, Middle, and Southern Semitic languages.

The Eastern Branch.—The Eastern branch includes the Babylonian and Assyrian languages. Assyrian is really a dialect of Babylonian, there being but very slight phonetic differences between the two, although the difference is somewhat greater in the form of the characters. Babylonian is found much earlier than Assyrian, and also continues somewhat later. The Babylonian inscriptions thus far found begin probably before 4000 B.C., perhaps as early as 5000–5500 B.C., and extend to the capture of Babylon in 538 B.C. Babylonian was also used later as a literary language under the Persian and Greek rulers of Babylonia. Assyrian inscriptions extend from about 1800 B.C. to shortly before the fall of Nineveh in 606 B.C.

The Northern Branch.—The Northern Semitic or Aramaic branch includes many languages and dialects, to all of which the general term Aramaic is applied. The oldest Aramaic literature is found in the inscriptions from Senjirli, of the 8th century B.C., some words on Assyrian and Babylonian tablets being only a little later. The language of these inscriptions differs very much from the later Aramaic languages, and resembles the Canaanite language in many particulars. The Aramaic languages are divided into two principal branches, Western and Eastern, the geographical distribution of which was largely in harmony with these names. Western Aramaic may be called one language, with the following principal dialects: Biblical Aramaic, being the language of portions of the Old Testament books of Daniel and Ezra, and of a few words elsewhere in the Old Testament; Targumic Aramaic, usually so called, the language of the Palestinian Targums; the similar language of most of the Gemara of the Palestinian Talmud, and of the Palestinian Midrashim, which is also found in small parts of the Mishna, and also of the Babylonian Gemara; Samaritan, the language of the Samaritan Targum to the Pentateuch; the language of some Jewish inscriptions and papyri from Egypt, dating somewhat before the time of Christ; the language of the few Aramaic words found in the New Testament; the language of the inscriptions found in Tadmor or Palmyra; and the language of the Nabatean inscriptions found in Idumea and vicinity. The only modern representative of Western Aramaic is the language spoken at the present time by a few people near Damascus, in and near the village of Malula which is written in the Syriac character but belongs in this class. Eastern Aramaic includes Syriac, Mandaic, being the language of the Christian sect of Mandæans who lived east of the Tigris and the language of the most of the Babylonian Gemara. Syriac was the language of the Christian Arameans, and was employed in an extensive literature, chiefly of an ecclesiastical nature, extending from the 2d

to the 13th century A.D., including the translation of the Bible known as the Peshitta. The word Syriac means the same as Aramaic, and was adopted by the Arameans from the Greeks, because the word Aramaic had come to be used as meaning heathen. After the separation of the two sects known as the Nestorians and Jacobites, each developed its own dialect, known as the Nestorian and the Jacobite respectively. The actual dialectal differences are but slight, chiefly in the pronunciation of the vowels. In writing, somewhat different forms of the characters were used, and the vowels were represented by entirely distinct systems, in the Nestorian dialect by dots, in the Jacobite by characters borrowed from the Greek. The modern representative of the Nestorian branch is the language used by the Nestorian Christians, in parts of Persia, especially in the city of Urmia and vicinity, in some villages in Kurdistan, and in portions of Mesopotamia. This language shows very many changes from ancient Syriac, those in the verb being especially striking, while the vocabulary has received very many foreign words, especially from Arabic, Persian, and Kurdish. Further, this language shows forms not found in Syriac, but preserved in other Aramaic languages as well as in some of the other Semitic languages, so that it is evidently descended not from ancient Syriac itself, but from a closely related dialect. There are four principal dialects of modern Syriac, that used in Urmia and vicinity, that of northern Persia and some adjacent regions in Turkey, that of Kurdistan, and that of Mosul and vicinity. While the language is the same in all these, yet there are very many dialectal variations. The modern representative of the Jacobite Syriac is the language of Tur Abdin, in western Kurdistan, which is similar to the modern Nestorian language, but with many differences.

The chief general feature that distinguishes the Eastern and Western Aramaic languages is the preformative of the imperfect. This is *y* in all the Western Aramaic dialects, although a few forms with *l* are found in Biblical Aramaic, and *n* in all the Eastern, although Mandaic and the Babylonian Talmud have *l* along with *n*. In modern Syriac the verbal form is so much different that no preformative is used.

The Middle Branch.—The middle Semitic branch is also called Canaanite, for all its languages are often included under the general term Canaanite. The only one of these languages in which much literature has survived is the Hebrew. The ancient Hebrew is found in the Old Testament, in the Siloam inscription, and in some brief inscriptions on seals and coins, most of which belong before the Christian era. The Siloam inscription is probably the oldest Hebrew document preserved in its original form, being usually dated in the time of Hezekiah, about the end of the 8th century. New Hebrew or Mishnaic Hebrew is found chiefly in the Mishna, and also somewhat in the Gemara, and in related works. Hebrew has continued to be used somewhat by the Jews as a literary language even to the present time, most of the later literature being produced in the Middle Ages. The language as thus used is ordinarily similar to Mishnaic Hebrew. The Phœnician has much that is identical with the Hebrew, while the differences are slight, affecting the vowels more

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than the consonants, although the vocabulary shows some variations. It is found in inscriptions from Phœnicia and her colonies, prominent among the latter being Carthage, where the language was called Punic. Considerable portions are also found quoted in works of Latin and Greek authors, chiefly in the *Pœnulus* of Plautus. Most of the Phœnician inscriptions are from the 4th century B.C. and later, some are as old as the 6th century, while the oldest inscription may belong to the 8th century or a little earlier. The inscription of Eshmunazar, from the time of Alexander the Great, is the most important. In this group are also included the Moabite, Ammonite, and Edomite languages. The last two are known only from the proper names found in the Old Testament and the inscriptions of other nations, the Moabite from that source and also from the Moabite stone, written by Mesha, king of Moab, and dating from about 850 B.C. All three are substantially identical with Hebrew, the Moabite, which is of course known more fully than the other two, showing slight dialectical variations. Moabite and Phœnician, like Hebrew, have waw consecutive with the imperfect. Some of the Philistine proper names given in the Old Testament are Semitic. It is generally agreed, however, that the nation was not Semitic, but perhaps learned and used the common Canaanite language after their arrival in Palestine. Reference should also be made to the Canaanite glosses in the Tel el-Amarna letters (see *AMARNA LETTERS*) which are older than any inscriptions here mentioned.

The Southern Branch.—The Southern Semitic branch is sometimes called the Arabic group, because the Arabic language is its most important representative. Under Arabic may be included ancient or classical Arabic, its descendant, modern Arabic, and southern Arabic, often improperly called Himyaritic, including the closely related dialects of Sabæan and Minæan. The great work in ancient Arabic is the *Quran*, composed by Mohammed (570–632 A.D.), although a few poems are older than this. Printed modern Arabic is substantially the same wherever found, and does not differ greatly from the ancient language. The spoken language, however, is divided into many dialects, of which the most important are those of Syria, Egypt, Mesopotamia, Tunis, Malta, and Oman and Zanzibar. Under the general head of modern Arabic may be included the very extensive Arabic literature from soon after the time of Mohammed down to the present time. Sabæan and Minæan are found in inscriptions, chiefly in southern Arabia. These are of uncertain date, although it is now often claimed that the earliest Minæan inscriptions are earlier than 1000 B.C., while the oldest Sabæan are somewhat later. Modern representatives of these dialects are found in the present dialects of the same region, of which little is known. Included in the Southern Semitic branch is also Ethiopic, or more properly Geez. This was probably a descendant of Sabæan. The ancient Ethiopic was the language of Abyssinia. It closely resembles the Arabic dialects, sharing with them some of their most characteristic features, while in many other respects it differs greatly from them. It was the spoken language of Abyssinia till about the 13th century A.D. The earliest known literature comes from about

500 A.D. Most of the literature consists of translations from other languages. The most important documents are the translation of a part of the Bible, made about 500 A.D., and the apocryphal Book of Enoch, which is a translation from a lost original. Modern representatives of the language in the same region are the Tigré, the Tigrina, and, with extensive incorporation of foreign elements, the Amharic.

The Written Characters.—The written character of the Babylonian and Assyrian languages is the cuneiform, the writing being partly ideographic and partly syllabic, but not at all alphabetic. (See *CUNEIFORM WRITING*.) This, however, according to the common view, was not the invention of the Babylonians, but was taken by them from the earlier inhabitants of the land, the non-Semitic Sumerians. It was originally a picture writing, like the hieroglyphics of the Egyptians, but has been so largely conventionalized that in most cases the resemblance to the original picture has been lost. The Assyrian forms, when they differ from the Babylonian, show modifications in the direction of greater conventionalizing and increased regularity. Aside from the cuneiform, all Semitic languages use an alphabet, consisting entirely of consonants, which goes back in all to the same original forms. Ethiopic is an apparent exception, in that the vowels are written with the consonants, that is, each consonant has six or more different forms according to the vowel following it. These forms have such a resemblance to those of the other Semitic languages, however, and in particular to the Sabæan which is written without vowels, that it is probable that the earliest form contained simply the consonants, and that the modifications of form for the expression of the vowels show a later development. What is commonly regarded as the earliest form of the Semitic alphabet is usually called the Phœnician, a name given to it by the Greeks because they obtained it from the Phœnicians. But the Phœnician alphabet at the time of our earliest knowledge, about the 8th century B.C., was practically identical with the forms found at about the same time among the other Canaanites and the Arameans. The origin of this alphabet is doubtful, the common view at the present time being that it was derived from certain Egyptian characters, while some regard it as taken from the Babylonian. After the Greeks obtained this alphabet, it passed from them to the Romans, and then to the many modern alphabets derived from the Greek and Latin. The earliest inscriptions known in this alphabet are probably the Moabite stone, about 850 B.C., in the Moabite language, a Phœnician inscription of about the same date, the Siloam inscription, about 700 B.C., in Hebrew, and inscriptions from Senjirli, the 8th century B.C., in Aramaic. All these have substantially the same forms. Within the next few centuries two types gradually arose, the old Hebrew, and the Aramaic or square characters. The old Hebrew was used in writing Hebrew till the Jews adopted Aramaic as their vernacular, which was at any rate before the time of Christ, when they naturally came to use ordinarily the Aramaic form of character for the Hebrew as well. The Samaritans have always used the old Hebrew form of character, with many changes, especially in the direction of greater elaborateness. The only modern use

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of this form of character is in the Samaritan of the present day.

The earliest Syriac character, known as the Estrangela, was a cursive writing developed from the Aramaic form. From this came the later Syriac forms, both Nestorian and Jacobite, and also the Arabic characters, including both the Kufic and the Neskhî.

The southern Arabic characters, found in Sabæan and Minæan, differ greatly from those already mentioned, and are perhaps earlier than any other forms which have been found. They are to be traced, however, to the same common character in an early form. The Ethiopic character is a development of the southern Arabic form.

The Ethiopic language and the Assyrian and Babylonian are written from left to right. All the other Semitic languages are written from right to left.

General Characteristics of the Semitic Languages.—The modern Semitic languages and dialects have of course been greatly changed by the influence of the other languages with which they have been brought in contact. These, therefore, should not receive a prominent place in the consideration of the general characteristics of the Semitic languages, although they may offer confirmatory testimony in some particulars. Some of these general characteristics of the ancient Semitic languages may well be noted, keeping in mind a comparison with other languages, especially with the Aryan group. It is not claimed, of course, that the characteristics which will be here named have no similarities elsewhere, but rather that they may fairly be considered general characteristics of the Semitic group, as they could not be of any other group.

The Semitic languages divide the letters into two general classes, consonants and vowels, the consonants being the more important. Roots are composed only of consonants, while the vowels are used, along with consonantal changes, to express modifications of the fundamental root idea. Although the vowels are thus important, it is in a domain entirely subordinate to the consonants. The result of this is that in all the languages except the Assyro-Babylonian and Ethiopic the consonants only were originally written, and the vowels added by means of small marks, for the most part above or below the consonants. In fact, it was only in comparatively late times that the vowels were written at all. The inscriptions, such as those of Phœnicia, and of Senjirli, the Moabite stone, and the Siloam inscription, have no vowels. In the Assyro-Babylonian the vowels are expressed, but the characters are usually supposed to have been borrowed, as has already been noted. In the Ethiopic the vowels are expressed by slight changes in the form of the consonant, a feature, however, which is probably to be regarded as a late development, although going back to the earliest known literature. The consonants alone were probably originally written.

Originally the Semitic languages were characterized by the possession of a large number of gutturals, some of them very peculiar. In course of time, however, part of these were lost by most of the languages, the Arabic preserving them the most fully.

The Semitic roots are almost entirely triliteral, that is, each consists of three consonants.

An occasional root is found which contains four or more consonants, but these are exceptional. On the other hand, the belief is growing that many of the triliteral roots, especially some of the so-called weak roots, were originally biliteral. But here the tendency of the languages toward triliterality is seen plainly from the fact that to a large extent these roots have assumed the appearance of triliterality.

The relation between nouns and verbs is very close. In fact, most of the features of inflection are the same in both, the noun being the earlier.

A prominent characteristic of verbal inflection, with many similarities in the nouns as well, is the development of many different stems or conjugations from the same root. These are formed partly by internal change in consonants and vowels, and internal additions, and partly by external additions. Thus one stem has an intensive meaning, another a causative, another a reflexive, etc. In the original Semitic there must have been many different stems. Some have been lost in each language. The Ethiopic has preserved the largest number, next the Arabic, then the Assyrian. These stems afford a very concise way of expressing many different shades of meaning connected with a single root idea, each of which would in most languages require either a compound verb or the addition of separate words for its expression.

The languages use pronominal suffixes attached to nouns, verbs, and prepositions. These are really shortened forms of the pronouns. With nouns they have the force of a genitive, with prepositions of a dative, and with verbs ordinarily of an object accusative.

The languages are distinctly objective. The personal standpoint of the speaker or writer counts for little. In the verb, the third person is the simple uninflected form, the starting point of the inflection, it is the first person in the Aryan languages. The present time, the time of the speaker or writer, is of little importance in comparison with the past and future. The use of the tenses is often based upon an assumed standpoint. So also many phrases imply the assumption of a standpoint other than that of the writer or speaker.

Certain phenomena may be classed together under the general statement that they show a lack of development in the languages. This is not, however, due to lack of time or of favoring circumstances, because these features are ordinarily found to characterize in a similar way all the languages at all times and under all circumstances. These phenomena indicate rather psychological characteristics of the people, their natures are not complex, they show limitations in some directions. Certain developments which are common in Aryan languages the Semites did not feel to be necessary. Among these characteristics may be mentioned the following:

Most of the Semitic languages have only two tenses, usually called the perfect and the imperfect. Whether these differed in their fundamental meaning from some of the tenses of the Aryan languages is a question on which there is difference of opinion. The later forms of several of the languages developed a present tense from a participle, which is only suggested in the earlier usage. In general the Semitic tense usage is thus much less fully developed than the

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Aryan. Moods also are relatively undeveloped. They are found only in connection with the imperfect tense, even the imperative being derived from it, and in most of the languages they are not widely used.

The nouns have only two genders, masculine and feminine.

There is an almost entire absence of compound words, both nouns and verbs, except in proper names.

The syntax is in many particulars of a simple and undeveloped kind. There is a strong tendency to leave much in the relation of clauses and sentences to inference. This leads to the very frequent use of parataxis. There is but a small number of particles of every kind. In most of the languages the original case endings have been lost, but there has been no great development of prepositions to take their place. There is also a scarcity of adjectives in most of the languages, so that nouns are often used in their stead.

Relation to the Primitive Language.—No existing language can be called the common mother of the other Semitic languages, nor even the most primitive in every respect. Each of the languages is probably in some features more primitive than any other. But the Arabic preserves far more that is primitive both in grammatical forms and syntactical usage than any other of the languages. This is in spite of the fact that the known Arabic literature is very late. The Arabs in their desert home remote from other nations changed the language less than other peoples in a shorter space of time. Thus the Arabic preserves the case endings, which have been largely lost in the other Semitic languages, except in the Assyro-Babylonian where they are often used indiscriminately. The Arabic preserves the original endings, sometimes consonants, more often vowels, both in verbs and nouns, which are largely lost elsewhere. The Arabic retains in most cases the original vowels, which in the other languages undergo various changes, such as heightening, shortening (vocalization), and contraction, although the Ethiopic has also retained many of these. The formation of the plural of nouns by internal changes, the broken plurals, which is so prominent a feature of the Arabic, is only found elsewhere in Ethiopic. This was probably a primitive feature.

See ARABIAN LANGUAGE, ASSYRIA, BABYLONIA, ETHIOPIA, HEBREW LANGUAGE AND LITERATURE, MOAB, AND PHENICIA.

Bibliography.—Lidzbarski, 'Handbuch der nordsemitischen Epigraphik'; and 'The Hebrew Alphabet' (in Jewish Encyclopedia); Lindberg, 'Vergleichende Grammatik der semitischen Sprachen'; Nöldeke, 'Die semitischen Sprachen'; Renan, 'Histoire Générale des Langues Sémitiques'; Wright, 'Comparative Grammar of the Semitic Languages'; Zimmern, 'Vergleichende Grammatik der semitischen Sprachen.' GEORGE RICKER BERRY, PH.D.,
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Semitic Nations, those nations whose languages were Semitic, and which were consequently racially connected. (See SEMITIC LANGUAGES.) In considering the Semitic nations as a group, the first question is of course concern-

ing their primitive home. Primitive is here used only in a relative sense, for the very earliest history of these nations goes back to a time concerning which, in the present state of knowledge, there is no positive information or plausible inference. The consideration of that time would involve a discussion of the origin of the whole human race, which is a question too broad to be entered upon here. By primitive home is meant, therefore, the location of the Semites when they were one people, the common distributing point of the Semitic nations. While entire certainty on this point is not attainable, yet there are some indications which may be followed.

Some have found this primitive home in Babylonia or its vicinity. For this the chief argument is based upon language. A consideration of the words common to all the Semitic languages is thought to point to the conditions prevailing in Babylonia, or in some adjacent country from which Babylonia was the first stopping place of the undivided race. But this argument from language is inconclusive, in view of the possibility of the disappearance from a language of words once common, and also of the borrowing by one Semitic language from another. The fact that the known history of Babylonia extends back to a point much earlier than that of any other Semitic nation has very little to do with the question.

There are many arguments in favor of Arabia, that is, central and northern Arabia, as the primitive home. Arabia is a country which is largely desert, except in the southern part. Such a country, it is said, best explains the racial characteristics. These characteristics, as usually given, are intensity of faith, ferocity, exclusiveness, and imagination. It is also said that the Arabs have preserved the Semitic character and characteristics in their purest form. Certainly those characteristics which have just been mentioned are found combined among the Arabs more fully than elsewhere. A desert origin seems, also, to explain most satisfactorily some features of the Semitic languages. This is true especially of the great predominance of gutturals. Such a development of these as was found in primitive Semitic demands good physical powers, which would come from an outdoor life in a pure atmosphere, and plenty of leisure for conversation. These conditions are met in Arabia. In this connection it is important to note that the Arabs have preserved the gutturals more fully than any other Semitic nation, the others having considerably modified their primitive habits of life. Again, it is by some regarded as a universal law that nomads may adopt settled habits of life, but that the reverse process does not take place. This rule perhaps is not invariable, yet it does represent the usual tendency. When, therefore, we find some Semitic nations nomadic and others not, it follows that the nomadic form of life is probably the earlier. For this nomadic form of life the natural location is Arabia. Further, the close resemblance of the Semitic languages to one another, much closer than in any other known group of languages, indicates some of the early conditions surrounding the nation. It suggests that the primitive nation lived in a comparatively limited space for a long period of time before being divided, giving opportunity for much common development of the language, and also that

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it was largely isolated from other nations, who would influence the language. Such a country of moderate size, in comparative isolation from other countries, is Arabia alone in the region inhabited by Semitic peoples, or in their vicinity.

Another view is that the primitive home was in Africa. According to this view, however, as ordinarily held, the Semites very early migrated into Arabia, and there lived for a long period of time before any division took place. This view would, therefore, make Arabia the centre of distribution for the Semitic nations. Hence the arguments already adduced in favor of Arabia would still be valid upon this view, but additional arguments are presented in favor of going back one step further to an African home. In support of this view the chief argument is that there is supposed to be a racial connection between the Semitic and Hamitic peoples. By Hamitic peoples are not meant the negroes, but the Egyptians, Berbers, etc., although it is by no means certain that the Egyptians are Hamitic. For this racial connection there are two chief arguments. One is from resemblance in physical characteristics, concerning which, however, the evidence is inconclusive. The other is from resemblances of the languages, and is of greater force. The general resemblances between the Hamitic and Semitic groups of languages are the following: the pronouns are similar; the verbs have similar tenses and formation of stems; it is claimed by some that the Hamitic roots, like the Semitic, were originally triliteral; the ending for feminine gender is the same, *t*; several of the numerals are very similar; both groups form nouns by means of a prefixed *m*; both write without expressing the vowels; and fifty or more words of ancient Egyptian are said to be identical with Semitic words. The possibility of accounting for these resemblances by borrowing from the Semitic languages by the Hamitic does not seem, however, to be entirely excluded. Of course, not all of the resemblances are such as are most liable to be borrowed, but any of them might be. The possibility of such borrowing is increased, too, by other considerations. For the Egyptian resembles the Semitic languages more than any other Hamitic language. And it has been thought, on other grounds, that Egypt had been subject to Semitic influences in early times. Some have believed, for example, that certain features in early Egyptian civilization were taken from the Babylonians. Others have thought that Arab invaders came into Egypt in early times. Such a relationship as is claimed between the Semitic and Hamitic races can not be said, therefore, to be yet established. And even if there were such a relationship, no sufficient reason appears for thinking that the primitive race must have had its home in Africa rather than in Arabia.

The conclusion that the earliest known home of the Semites was in Arabia may be said, therefore, to be reasonably well established. The arguments which are thought to show a previous residence in Africa are inconclusive. That view can only be regarded, in the present state of knowledge, as a conjecture with very little evidence to support it.

Separation into Nations.—Concerning the precise, or even approximate, date of the separation of each nation from the parent stock nothing is known. The recorded history of every Semitic nation begins long after that time. Even the

order of departure of the different nations is not certain. Here, however, the languages themselves come in to supplement our direct knowledge. On account of the resemblances of the languages to each other, the order of separation is often stated thus. All the other groups departed from the southern, that is, migrated from Arabia, and settled in Babylonia and its vicinity. After dwelling here together for a long time, the Arameans first separated, then the Canaanites, and finally the Assyrians. There was also emigration southward, giving the southern Arabs, a branch of whom ultimately migrated to Abyssinia. It is doubtful, however, whether this outline is correct in all details. It assumes that the Canaanites are more closely related to the Babylonians than are the Arameans, while in reference to some features of the languages the reverse is true. It also presents difficulties in accounting for the Arameans from the time of such separation until their appearance in history. For while some had settled in upper Mesopotamia at an early time, yet the Assyrian inscriptions indicate that fresh streams of migration were coming into upper Mesopotamia, and into Babylonia and Assyria, for a considerable period of time before and after 1000 B.C., apparently from Arabia. It seems probable, then, that at the first general separation between north and south, the ancestors of the northern nations went not to Babylonia, but to northern Arabia. After a considerable sojourn there, the Babylonians continued their journey to Babylonia, and part or all of the Canaanites, after a time, went on to Canaan, while the Arameans remained in northern Arabia, from which region successive waves of migration swept over Mesopotamia, Syria, and their vicinity. The nomadic habit of life of many of the Arameans, which seems to be indicated in the Assyrian accounts, also points to such a residence in Arabia as is here indicated. Contact after the original division doubtless had much influence on language. The Arameans were probably thus influenced by the Arabs and by the Babylonians. The Babylonians themselves were also influenced by the Arabs with whom they had commercial intercourse in early times. Further, the Canaanites were without doubt influenced by the early intercourse between Babylonia and the region of Palestine.

The Individual Nations.—The earliest Semitic nation of which we have any history was the Babylonian. Their own records, which begin probably before 4000 B.C., perhaps considerably before that time, give our first information concerning them. The earliest inscriptions show them already in secure possession of Babylonia. The earlier Sumerian inhabitants, according to the usual view, were subject to them, and were gradually incorporated by them. Ultimately the population of Babylonia became considerably mixed. The non-Semitic Elamites and Kassites had dominion over the land at various times, and must have contributed materially to the population. In the course of their history also it is probable that many Arabs and Arameans were incorporated into the population. The Babylonians remained a distinct people until their conquest by the Persians under Cyrus in 538 B.C., after which time they never again became independent, and doubtless were mingled with the Persians and others with whom they associated. The Babylonians were never nomads in historical times, but dwelt largely in cities. In all the early

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history, and down to about 2300 B.C., the government was one of cities, with no power actually supreme. The Babylonians were not unwarlike, but were especially devoted to religion, commerce, science, and education. Assyria was doubtless settled by colonists from Babylonia somewhat before 2000 B.C., and was at first subject to Babylonia. From about 1500 B.C., however, the nation was independent, and for most of the period from 745 to 606 B.C. held Babylonia in subjection, as well as at times before 745. Their national history ended with the capture of Nineveh by the Medes in 606 B.C. The Assyrians were much more warlike than the Babylonians, and considerably given to commerce, but cared much less than the Babylonians for religion, science, and education.

The Arameans were not one nation, but rather many tribes. They came in waves of migration from Arabia to the frontier of Babylonia, and to upper Mesopotamia, and finally reached the country later called Syria. In the Old Testament, Arameans are alluded to in connection with Abraham and his descendants, especially Jacob. The earliest mention of the Arameans elsewhere is probably in the Tel el-Amarna letters in the early part of the 14th century B.C. The Assyrian kings also speak of them from time to time in their inscriptions, beginning in the 14th century. From all indications it would seem that their earliest settlement of importance was in upper Mesopotamia, between the rivers Euphrates and Khabur. This settlement was reinforced by fresh arrivals from time to time. Just when they passed over the Euphrates and occupied Syria is uncertain, but the indications suggest that somewhat before 1000 B.C. they had obtained possession of most of the country, especially the northern and middle portions, defeating and driving northward the Hittites who had previously possessed the country. About the same time they began to come in large numbers into the territory of Assyria and Babylonia, especially along the Euphrates. In the time of Tiglathpileser III. and later, 745 B.C. and afterward, they also had settlements along the lower Tigris. In the earliest notices of them they were largely nomadic, but they soon turned to settled habits of life. In their government there was little unity, each political division consisted of a strong city and the people inhabiting a greater or less amount of territory around the city. Several of these city states would unite for a campaign, but these leagues never lasted long. The Old Testament speaks of the Arameans in connection with several cities, namely, Damascus, Zobah, Maakah, and Beth Rehob. Other prominent cities of the Arameans were Hamath in Syria, and Haran in Mesopotamia. Upper Mesopotamia is spoken of in the Old Testament as a region by the names Aram Naharayim and Paddan Aram. The most powerful of the Arameans were included in the kingdom of Damascus, but their power was broken when Damascus was captured by Tiglathpileser III. about 732 B.C. After this time the population of Syria and upper Mesopotamia no doubt continued to be largely Aramean for centuries, although the people did not form a nation, and had little political power. Of the many who used the various Aramean languages and dialects after this time (see SEMITIC LANGUAGES), it is probable that a large part were Arameans. But naturally many others

were mingled with them, so that in their later history the Aramaic-speaking people represented a mixture. The language was also adopted by those who were not Arameans, as, for example, by the Jews. Some who have left inscriptions in the language were not Arameans, but Jews and Arabs. The Arameans were a people of considerable warlike ability, although with little taste for political organization, and were much given to commercial pursuits.

All the Canaanite Semitic nations aside from the Hebrews, namely, Ammon, Edom, Moab, and Phoenicia, were occupying their respective countries before the arrival of the Hebrews from Egypt, how long before is not known with certainty. Ammon, Edom and Moab may have come with Abraham from Ur. The Phoenicians are mentioned in Egyptian records as early as the 16th century and are prominent in the Tel el-Amarna letters. The Phoenicians were distinguished beyond any other Semitic nation as a commercial people, especially on the sea, and were great colonizers. Their form of government was the city state, Tyre and Sidon being the two most prominent cities. Whether the Hebrews were actually Canaanites or were a branch of the Arameans is uncertain, the indications for the latter view coming entirely from the Old Testament. If this view be correct, the Hebrews spoke Aramaic on their arrival in Canaan, and learned the Canaanite language from the people there. The other view is, however, rather more probable, according to which the Hebrews were themselves a branch of the Canaanites, although evidently closely associated with the Arameans in the experiences of Abraham, the founder of the nation, and his immediate descendants. The earliest information concerning Abraham in the Old Testament connects him with the city Ur in Babylonia. Both the Old and New Testaments originated among the Hebrews. The Hebrews were not particularly distinguished as warriors, and in ancient times had no inclination toward commercial pursuits.

If the earlier conclusions concerning Arabia as the distributing point of the Semites are true, it is evident that after the departure of the nations hitherto mentioned the Arabs remained by themselves in central and northern Arabia at a period long before we have any record of them. There are no indications in the early history that the Arabs had a centralized government. Rather it would seem that, being nomadic, they were early separated into many different tribes, having no political unity. They are mentioned quite often by the Assyrian kings who fought with them, beginning with Shalmaneser II. in 854 B.C. Their chief military activity came during and after the time of Mohammed.

Of the time of migration into southern Arabia there is no definite information. Southern Arabia is of a different character from the rest of the land, being fertile and adapted to agriculture. The immigrants here naturally abandoned the nomadic habit of life. The knowledge of these south Arabian kingdoms comes chiefly from their own inscriptions, whose date is by no means certain. It is now thought, however, by those who have given special attention to the matter that the earliest south Arabian kingdom was the Minæan, extending from about 1250-600 B.C., at the latter date being conquered by the Sabæans, while the Sabæan kingdom lasted

from about 750-100 B.C. Both were evidently kingdoms of considerable power. Probably about 350 A.D. some Sabæans migrated to Abyssinia, and there founded the kingdom of Aksum, where the language called Ethiopic was spoken.

Characteristics of the Semitic Peoples.—It is evident that the Semites as a whole were decidedly religious. But it is now evident that there was no Semitic tendency to monotheism, as was formerly supposed. The three great monotheistic religions of the world, to be sure, Judaism, Christianity, and Mohammedanism, have come from the Semites. But Mohammedanism was strongly influenced by Judaism, and Judaism and Christianity owe more to revelation than to any natural tendency of the Hebrews. The Hebrews had, in fact, a tendency to polytheism, as is shown by their history in the Old Testament. The Arabs were polytheists before the time of Mohammed. All the other Semitic nations, so far as we know them, were polytheistic.

In considering other characteristics and achievements of the Semites, especially in comparison with the Aryans, it needs to be remembered that the prominence of the Semitic nations precedes that of the Aryans. Hence the Aryans have been able to profit by whatever was good in the Semitic achievements. Considered in the light of their own times, the Semites were not deficient in those traits which have distinguished the Aryans. Usually, however, not more than two or three Semitic nations have manifested conspicuously any one of such traits. In warfare the Arabs, under Mohammed and his successors, the Assyrians, and the Babylonians achieved signal success. The Assyrians, for their own time, were great organizers of conquered territory. The scientific attainments of the Babylonians were such that nearly all nations of antiquity learned many things from them, such as astronomy and mathematics. The Assyrians and Babylonians showed much artistic ability. Much of the literature of the Semitic nations is imaginative, especially the poetry and mythology.

See ARABIAN LITERATURE; ASSYRIA; BABYLONIA; ETHIOPIA; HEBREWS; LANGUAGE AND LITERATURE; PHENICIA; SYRIA.

Bibliography.—Barton, 'A Sketch of Semitic Origins'; Brinton, 'The Cradle of the Semites'; Hommel, 'Die semitischen Völker und Sprachen'; and 'The Ancient Hebrew Tradition'; McCurdy, 'History, Prophecy and the Monuments'; Nöldeke, 'Die semitischen Sprachen'; Smith, 'The Religion of the Semites'; Wright, 'Comparative Grammar of the Semitic Languages.'

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Semmering, zēm'ēr-īng, Austria, an Alpine pass on the borders of Styria and Lower Austria, 44 miles southwest by west of Vienna. The road over the Semmering Pass (2,940 feet) is of ancient date and here between 1848 and 1853 was built the famous Semmering Railway, the first of the European mountain railways. The railway begins at Gloggnitz, and is carried along the face of precipices by means of 15 tunnels and 16 viaducts to Mürzzuschlag. The scenery along this portion of the line is of the grandest and most picturesque description. At its highest

elevation, 2,891 feet, the line pierces the Semmering in a tunnel 4,667 feet long. Its entire length is 25 miles, and it was constructed for the Austrian government at a cost of about \$7,000,000.

Semmes, sēmz, Raphael, American naval officer: b. Charles County, Md., 27 Sept. 1809; d. Mobile, Ala., 30 Aug. 1877. He became a midshipman in the United States navy in 1826, a lieutenant in 1837; was volunteer aide to General Worth in the Mexican War; and secretary to the lighthouse board in 1859-61. Upon the secession of Alabama, he resigned his commission, and was assigned to the command of the steamer Sumter, the first vessel of the Confederate navy. With this ship he cruised with success against Northern commerce in the West Indies. He then had the swift steamer Alabama (q.v.), or No. 290, built in England, and in September 1862 started on his well-known voyage. He flew British colors when approaching his prey, hoisting the Confederate ensign when sure of the prize. His seamen were chiefly English. After a destructive career, during which he captured 64 vessels and burned all but seven, his ship was sunk off Cherbourg harbor, France, by the Federal steamer Kearsarge, Captain Winslow, 19 June 1864. Subsequent to the war he practised law. His writings include: 'Afloat and Ashore during the Mexican War' (1851); 'The Cruise of the Alabama' (1864); 'Campaign of General Scott in the Valley of Mexico' (1852); 'Memoirs of Service Afloat during the War between States' (1869).

Sem'nopithe'cus, a genus of Asiatic monkeys, the langurs, including species possessing an elongated tail, cheek pouches, and ischial callosities. All of this genus are inhabitants of Asia and Asiatic islands. The sacred entellus monkey is a familiar example. See LANGUR.

Semolina, hard grains of wheat left in the bolting cloth when the fine flour has been passed through its meshes, and some times manufactured by millers. Certain hard, large-grained wheats growing in southern Europe, produce the best semolina, which is used for thickening soups, for macaroni, for a French bread, as an addition to the Italian polenta, and is employed in puddings, especially in England.

Sempach, zēm'pāh, Switzerland, in the canton of Luzerne, lies eight miles northwest of the town of Luzerne, on the lake of the same name. It is a walled town and its chief interest consists in its having been one of the outposts of the Swiss in their conflict with Austria. The battle of 9 July 1386 in which the Austrians under Duke Leopold received a crushing defeat at the hands of the confederated Swiss, was fought under its walls—a victory the more remarkable as won against extraordinary odds, and in which the famous Winkelried was the hero; the duke with 600 knights were left upon the battlefield. The anniversary of this victory is always celebrated on this spot, by prayers and thanksgiving. Pop. 1,200.

Semper, zēm'pēr, Gottfried, German architect: b. Hamburg 29 Nov. 1803; d. Rome 15 May 1879. He attended the Johanneum of his native town and studied law in the University of Göttingen; but changed to the profession of art, having been attracted to the study of archi-

ture under Gau. He then took a journey through Italy, Sicily and Greece. On his return he published 'Bemerkungen über bemalte Architektur und Plastik bei den Alten' (1834); and the essays 'Die Anwendung der Farben in der Architektur und Plastik,' and 'Dorisch-Griechische Kunst in 6 Tafeln mit Farben' (1836). He became the pupil of Schinkel in Berlin, who ungrudgingly recognized his talent and educated him to fill the place of professor of architecture in the Dresden School of Building. Between 1837-41 he built several important structures in Dresden, including the Court Theatre, and in 1849 traveled to Paris and London, in which latter city he undertook among other things the arrangement of the statuary in Kensington Museum. He was active up to the time of his death in Dresden, Vienna, and other places, where his work is still a commanding feature of city architecture. He was an uncompromising adherent of the Renaissance style, as far as this was founded on the Roman of the later empire especially as exhibited in the composition of the forums. His buildings are distinguished for harmony of composition together with purity and moderation of detail. Among his many works on architecture may be noted: 'Über Polychromie und ihren Ursprung' (1851); 'Wissenschaft, Industrie, und Kunst' (1852); and 'Der Stil in den technischen und technischen Künsten' (1860-3). Consult: Lipsius, 'Gottfried Semper in seiner Bedeutung als Architekt' (1880).

Semper, Karl, German naturalist: b. Altona, Germany, 6 July 1832; d. Würzburg, Bavaria, 29 May 1893. He was educated at Kiel, Hanover, and Würzburg, traveled extensively in Europe and was engaged in a tour of the Philippines, China, Japan, and the South Sea Islands in 1858-66. On his return he was appointed to the chair of zoology at Würzburg which he occupied until his death. He delivered a course of lectures before Lowell Institute of Boston in 1877, afterward published under the title 'Animal Life as Affected by the Natural Conditions of Existence' (1881). He edited nine volumes of 'Arbeiten aus dem Zoologischen Institut' in Würzburg and also wrote: 'Reisen im Archipel der Philippinen' (1867-72); 'Die Palau Inseln im stillen Ozean' (1873); 'Die natürlichen Existenzbedingungen der Thiere' (1880); etc.

Sempill, Robert, Scottish ballad writer: b. about 1530; d. 1595. He was probably a cadet of the house of Sempill, of illegitimate birth; received an excellent education; spent part of his early life in Paris; and upon his return to Scotland went into military service. He ardently supported the Reformation in Scotland in his writings and severely attacked the Catholic cause. The majority of his poems have been preserved in the original, the most noteworthy of them being: 'Ane Complaint upon Fortoun' (1581); 'The Legend of the Bishop of St. Androi's Lyfe' (1854); and the 'Sege of the Castel of Edinburgh.' Two complete editions of his writings were published: 'The Sempill Ballates,' edited by T. G. Stevenson (Edinburgh 1872), and 'Satirical Poems of the Time of the Reformation,' edited for the Scottish Text Society by James Cranston, 2 vols. (Edinburgh 1880-93). The last two poems were included in the 'Scottish Poems of the

Sixteenth Century' edited by Sir John Graham Dolyel, 2 vols. (Edinburgh 1801).

Sem'pringham, Order of. See **ORDERS, RELIGIOUS.**

Sen, Keshub Chunder, an Indian religious reformer: b. village of Garifa (Gouripore), Bengal, 19 Nov. 1838; d. 8 Jan. 1884. His education was partly Hindu, and partly English. He became attracted in 1858 to the Brahmo-Somaj, the Theistic church of India, so much so that he soon began a campaign of religious reforms for the regeneration of his fellow countrymen. In 1865 a split in this church occurred, resulting in the formation of one body under the leadership of Sen and assuming the name of "Brahmo-Somaj of India." After a visit to England in 1870 he put into effect, and with beneficent results, some philanthropic schemes based on the principles of those he had seen there. In 1878 dissensions arose among his followers owing to his frequent displays of ill temper and to his leaning toward mysticism, and the congregation split. The last few years of his life were full of controversy, disappointment and sorrow. He wrote: 'Yoga, Objective and Subjective' (1884). Consult Max Müller, 'Biographical Essays' (1884).

Senac, Jean Baptiste, an eminent French physician; b. in the diocese of Lombec, Gascony, about 1693; d. 1770. He was graduated in physics at Rheims and later at Paris and in 1752 was appointed physician to Louis XV. He was a member of the Royal Academy of Sciences at Paris and of the Royal Society of Nancy. His greatest work and to which he owes his anatomical reputation was 'Traite de la Structure du Cœur, de son Action, et de ses Maladies' 2 vols. (Paris 1749). He also published an edition of 'Heister's Anatomy' (Paris 1724); 'Discours sur la Méthode de Franco, et sur celle de M. Rau touchant l'Operation de la Taille' (1727); 'Traite des Causes, des Accidents, et de la Cure de la Peste' (1744); and 'Lettres sur la Choix des Saignées' (1730), written under the pseudonym of Julien Morison.

Sénancour, Etienne Pivert de, French philosophic writer: b. Paris November 1770; d. Saint Cloud February 1846. He was of a melancholy and seclusive nature even as a boy, and read eagerly everything obtainable especially such books as related to travel. For four years he studied philosophy at the Collège de la Marche and was then sent to the Seminary of Saint Sulpice by his father's orders, but escaped from there and went to Lake Geneva. In 1798 he returned to Paris and devoted himself to literature, though the main source of his meagre income was a pension obtained from Louis Philippe through the good offices of M. Villenain. His chief works are 'Réveries sur la Nature primitive de l'homme' (Reveries of the Primitive Nature of Man) (1799); 'Obermann' (1804); 'Libres Méditations d'un Solitaire Inconnu' (Free Meditations of a Recluse) (1819). Of these 'Oberman,' a collection of letters from Switzerland treating on nature and the human soul, is by far the best known, and while a doubt bordering on atheism is expressed in its lines, yet the work is entirely original and contains many beautiful passages, showing a delicate and charming feeling for nature.

SENATE

Senate, United States. The Constitution of the United States provides that "all legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives. The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years, and each Senator shall have one vote." It was further provided that the Senators chosen at the first election should be divided into three classes, the seats of Senators of the first class to become vacant at the end of two years; of Senators of the second class at the end of four years, and Senators of the third class at the end of six years, thus providing that one third should be chosen every second year, and it is further provided that, "if vacancies happen by resignation, or otherwise, during the recess of the Legislature of any State, the executive thereof may make temporary appointments until the next meeting of the Legislature, which shall then fill such vacancies."

Regarding the qualifications of Senators the Constitution provides that "no person shall be a Senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall, when elected, be an inhabitant of that State for which he shall be chosen."

The Vice-President of the United States is president of the Senate, but has no vote unless the Senate is equally divided. The Senate is authorized to choose other officers, and also a president pro tempore, in the absence of the Vice-President, or when he shall exercise the office of President of the United States. The Senate has the sole power to try impeachments, and when sitting for that purpose its members must be under oath or affirmation. When the President of the United States is tried, the chief justice of the Supreme Court of the United States presides, and the concurrence of two thirds of the members present is requisite to convict. Judgment in cases of impeachment cannot extend further than to removal from office, and disqualification to hold and enjoy any office of trust or profit under the United States. The Legislatures of the respective States are empowered to fix the time, place, and manner of electing Senators, but Congress may make or alter such regulations, except as to the places of choosing Senators. The members of the Senate, like those of the House of Representatives, are in all cases, except treason, felony, and breach of the peace, privileged from arrest during their attendance on the sessions of the Senate, and in going to and returning from the same, and they are exempt from being held responsible elsewhere for anything said in debate in the Senate. No person holding any office under the United States can be a Senator, and no Senator can be appointed to office, the emoluments of which have been increased during his term of service in the Senate. These restrictions apply also to members of the House of Representatives. The Senate may propose or concur in amendments to revenue bills, but cannot originate them, that power resting in the House.

The Senate received its existing form as a recognition of the equality of the several States, and had not this concession to State's rights

been granted by the convention which framed the Constitution, the minor States would probably not have accepted that instrument.

The proceedings of the Senate were held in secret until the session of 1793, when discussions as to Albert Gallatin's right to a seat therein were held with open doors. This publicity had been urged from the beginning by those who argued that secret debates diminished the responsibility of the Senate, and of its individual members to the people, and that publicity would inspire popular confidence in the Senate and its course. A resolution was passed that after the termination of the session then being held, and as soon as suitable galleries should be provided, the galleries, except on special occasions requiring secrecy, should remain open while the Senate was engaged in legislative business. Executive business is still disposed of in secret session.

The question of electing United States Senators by direct vote of the people, instead of by the Legislatures of the several States, has been agitated for many years. For this purpose an amendment to the National Constitution is necessary. The Legislatures of 14 States passed resolutions in 1903 asking Congress to call a convention for the purpose of considering an amendment to the Constitution providing for such election of United States Senators. Resolutions to the same effect were presented in other Legislatures, and reached some stage of consideration. The States which passed the resolutions were Oregon, California, Minnesota, Texas, Arkansas, Nevada, Washington, North Dakota, Kentucky, Missouri, Utah, Montana, Idaho, and Kansas. In several States the rule has been adopted of placing the names of candidates for the United States Senate on the ballots for members of the Legislature, leaving to the Legislature nothing more, in effect, than ratification of the popular choice, the obligation upon legislators being similar to that which requires Presidential electors to select for President the person named for that office by their political party.

Next to President of the United States, and hardly excepting the vice-presidency, the office of Senator is more sought than any other under the National or State governments. In the earlier period of the government, when the States still regarded themselves as almost independent sovereignties, the governorship of a State was looked up to as an office but little short of the Presidency. In the more recent years of the republic governors have often been eager aspirants for the senatorial office, and very willing to give up their places as chief magistrates of their respective States to sit in the so-called Upper House at Washington. Many of America's great statesmen have been members of the Senate, and no body of modern legislators has more august traditions or associations. Some of the States make it a rule to re-elect the same Senators practically for life, and this is especially the case with the New England States, and in certain Southern States. Senators are extremely jealous of their liberty of debate, and it is possible for a minority to prevent the passage of a measure by talking against time, thus either defeating it altogether or bringing about a compromise. The present full membership of the Senate is 90, but several

SENATORIAL COURTESY — SENECA

seats are usually vacant through disputed elections or for other reasons.

Senato'rial Courtesy, a custom in the United States Senate by which the procedure of that body is based on personal honor rather than on a code of rules. For instance, senatorial courtesy permits a senator to speak without interruption and for an unlimited time. The Senate in the same line of courtesy will not confirm a Presidential appointee in a State whose senators object to the person nominated.

Sendai, sên-di', Japan, capital of the province Ken Mijagi, on the island Hondo near the eastern coast, 190 miles northeast of Tokyo. It is celebrated for its silk and lacquer manufactures, and carries on a considerable trade in fish and salt. It is on the railway running north from the capital.

Senebier, Jean, Swiss natural philosopher and historian: b. Geneva 1742; d. 1809. After studying theology he was ordained a minister about 1762, and for several years preached at Chancy. Philosophy and natural history, however, held more charm for him than divinity and in 1773 he left the ministry to become keeper of the public library at Geneva. In 1787, he also became one of the conductors of the *Journal of Geneva*. His most important works are: '*Essai sur l'Art d'observer et de faire des Experiences*' (2 vols., 1775); '*Mémoires Physico Chimiques sur l'Influence de la Lumière Solaire sur les Trois Regnes de la Nature*'; '*Rapports de l'Air avec les Etres organisés*'; '*Histoire Littéraire de Genève*' (3 vols., 1880); besides which he also published: '*Catalogue des MSS. dans la Bibliothèque de la Ville de Genève.*'

Seneca, Lucius Annæus, Roman philosopher, son of the rhetorician of the same name: b. Corduba (Cordova), Spain, about 4 B.C.; died in Rome by his own hand at the order of Nero, 65 A.D. As his family was wealthy and of equestrian rank, the boy was brought to Rome to be educated for the bar and an official career. He attended also with enthusiasm the lectures of several noted Pythagorean, Stoic, and Cynic philosophers. He had gained great fame for eloquence and had entered the senate through the quaestorship, when, in 41, at the instance of Messalina, who accused him of an intrigue with Julia Livilla, sister of the late Emperor Caligula, he was banished to Corsica. From there he sent to his mother Helvia the charming '*Consolatio*,' but exhibited little fortitude in his exile. Finally, in 49, Agrippina, who, after the execution of Messalina, had married Claudius, and had prevailed upon him to make her son Nero the heir to the throne, secured Seneca's recall that he might act as tutor to the young prince, then 11 years of age. At Nero's accession in 54, he wrote the curious political satire (still extant) on the death of Claudius, commonly known as *Apocolocyntosis* "*Pumpkinification*," a word formed upon the analogy of *apotheosis* "*deification*". During the first years of the new reign, Seneca, in conjunction with Burrus, prefect of the praetorian guard, was, on the whole, successful in keeping Nero within the bounds of humanity. Agrippina, ambitious and cruel, was determined to rule the state through her son, and Seneca seems to have palliated the latter's excesses in order to destroy his mother's influence over him. Finally, when Poppæa Sabina, with whom Nero had become infatuated,

induced him to order the assassination of his mother, Seneca wrote for the Emperor a letter to the Senate, asserting that Agrippina had conspired against his life, and had committed suicide upon being discovered. The death of Burrus in 62 made Seneca's position quite insecure. Nero fell into the hands of men like the infamous Tigellinus; money was needed to meet his extravagant expenditures and Seneca had become enormously wealthy. Foreseeing his probable ruin, he offered to resign to Nero all that he had, and, upon receiving a declination, couched in terms of specious affection, retired into the country and lived with utmost simplicity. In 65 he was implicated in the conspiracy of Piso and was ordered to commit suicide. With his wife Paulina, who insisted on dying with him (see the affecting account in Tacitus, '*Annals*,' XV., 60-64), he opened the veins of his arms. Paulina's life was barely saved by her slaves; Seneca, after suffering prolonged agony, during which he displayed the utmost serenity, was finally suffocated in a vapor bath.

"Nothing in life became him like the leaving it." He was undoubtedly an earnest seeker after truth and right. The Roman world was much his debtor for the wise and humane administration of the state during the "golden *quinquennium*" of Nero; but he lacked real strength of character, and in his connection with Nero, too often acquiesced in the doing of positive evil that a greater good might be accomplished. As a man of letters, he is incomparably the most brilliant figure of his time. He was an extremely prolific writer, his subjects are exceedingly varied, the ideas usually nobly conceived and eloquently expressed. In striking contrast to the periodic style of Cicero, he loves short, epigrammatic sentences. He is an expert in the use of every variety of rhetorical ornamentation, which, in harmony with the prevailing taste, he carries to excess. Though by no means a profound thinker, he is broad-minded and sympathetic in his presentation of the ethical principles, Stoic in the main, by which man's daily life should be guided. He was, indeed, by certain Fathers of the Church believed to have been a Christian, and there are still extant 14 letters, undoubtedly spurious, of a correspondence with Saint Paul. His moral essays embrace 12 so-called dialogues, '*On Peace of Mind*,' '*On Anger*,' '*On the Shortness of Life*,' etc.; 3 books '*On Clemency*,' addressed to Nero; 7 '*On Benefits*,' and 20 books of '*Letters to Lucilius*.' With these may be grouped the seven books of '*Naturales Quaestiones*,' which handle physics as a basis for ethical reflections. We possess also nine tragedies, composed rather to be read aloud than to be acted, and so rhetorical in substance that, though fine passages are not lacking, they are rather declamations than real poetry. They had, however, a great influence upon the drama of the 16th century.

Bibliography.—The best text of the prose works is by F. Haase, in the Teubner series (1893-5); of the tragedies, by F. Leo (Berlin 1878-9). The '*Apocolocyntosis*' has been edited by A. P. Ball (New York 1902). See also Merivale's '*History of the Romans under the Empire*,' cc. 50, 52-54; Zeller's '*Eclectics*' (London 1883); Farrar's '*Seekers after God*' (London 1886).

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SENECA—SENECIO

Seneca, a lake in New York, west of the central part of the State, about 25 miles south of Lake Ontario (q.v.), into which it discharges its waters by the Seneca and Oswego (q.v.). It is about 37 miles long, from north to south; and from one to four miles wide. Its depth is about 630 feet and it is 445 feet above sea-level. It is one of the group called the "Finger Lakes."

Seneca, a river of New York; flows east from the north end of Seneca Lake to the north end of Lake Cayuga, then turns north and is joined on the left by the outlet of Lake Canandaigua, then turns east, and receives in succession the drainage of the other parallel "finger lakes," Owasco, Skaneateles, and Onondaga, then turns northwest, taking the name of Oswego River (q.v.) and enters Lake Ontario at Oswego. Length, including the Oswego, nearly 100 miles.

Seneca, or Senega, Root. See POLYGALA.

Seneca Falls, N. Y., village in Seneca County; on the Seneca River, near Cayuga Lake, and on the New York Central & Hudson River Railroad; about 160 miles west by north of Albany, and 37 miles west by south of Syracuse. Electric lines connect the village with Cayuga Lake Park, three miles distant, and with Waterloo and other villages. A fall of 50 feet in the river affords extensive water-power for manufacturing, and explains the name of the place. Seneca Falls is in an agricultural and fruit-growing region. The chief industrial establishments are machine shops, woolen factories, fire-engine and pump works, grist mill, and furniture factory. The shipments are chiefly farm products, fruit, dairy products, pumps, and fire-engines. The educational institutions are a high school, an academy, public and parish elementary schools, private business schools, and a public library. There are three banks; the national bank has a capital of \$100,000. The government is vested in a village president and a board of trustees. Pop. (1890) 6,116; (1900) 6,519.

Seneca Indians (origin unknown; their own name is *Tsonondowanenaka*, or *Tsonondowaka*, "people of the great hill or mountain," probably referring to the lofty eminence south of Canandaigua Lake). A member of the famous League of the Iroquois, founded about the year 1570. With the Mohawks and the Onondagas, the Senecas constituted the elder phratry of tribes in the social and political organization of the confederation, while the junior phratry was composed of the Oneidas and the Cayugas. The earliest known council fire of the Seneca people was established south of Lake Canandaigua, while their territory comprised the region environing Seneca and Canandaigua lakes and extended westward to Genesee River. As a member of the League, the Senecas were called *Honěnninkohohite*, signifying, "They are fixed to a door or door-flap," denotive of the fact that the Seneca people were the political door-keepers of the League, not because, as commonly asserted, they stood at the western frontier of the territory of the confederation, but because being at first averse to joining the League, they were finally persuaded to do so by having the honor of the office of doorkeeper and of offi-

cial executioner bestowed upon them. Their last two League chiefs or rulers were charged with the duty of ascertaining the good or evil designs of any alien who might seek to enter the jurisdiction of the confederation. In the American Revolution the Senecas espoused the cause of Great Britain against the colonies. To-day the Senecas are represented by several different bodies of people dwelling in diverse places and under various forms of government. In 1900, 553 were on the Tonawanda reservation, 1,262 on the Cattaraugus reservation, 1,006 on the Allegany reservation, 10 on the Tuscorora reservation, and 6 on the Onondaga reservation, all in New York State; 87 were on the Cornplanter reservation in Pennsylvania, and 219 on the Grand River reservation in Ontario, Canada; total 3,143. In addition there are 337 so-called "Senecas" in the Indian Territory, but these are not included with the foregoing, as it is doubtful whether they were ever true Senecas. Skaniadario, or Handsome Lake, the founder of the reformed pagan Iroquoian religion in vogue to-day among the various northern Iroquoian peoples, was a Seneca. On the migration, or probably expulsion, of the Awenrehronon from the headwaters of Genesee River, N. Y., in 1639, and on the later defeat of the Neutral Nation, about 1649-50, and of the Eries about 1654-7, the Senecas moved some of their settlements and colonies westward toward Lake Erie and along Allegheny River. In 1657 there were 11 different alien tribes or peoples represented among the Senecas, thus indicating how well they exercised the right of adoption to replace their great losses in the almost interminable wars of the League, which had then lasted about 75 years. Of the several tribes formerly constituting the League of the Iroquois, the Senecas are the most progressive in the arts and knowledge of civilization. With incidental exceptions, the history of the Senecas previous to the American Revolution is virtually that of the League.

J. N. B. HEWITT.

Senecio, se-ně'si-ō, the largest known genus of plants, comprising about 1,000 species; it belongs to the *Compositae*, and is universally distributed. It is therefore practically impossible to give a compact description of the generic characters; but it may be said that these plants are annual or perennial herbs, shrubs, or even arborescent, have basal or alternate leaves, and solitary, corymbose, or paniculate heads of flowers, usually yellow in hue. These are made up of both radiate and tubular flowers, the latter being five-toothed and perfect, or of the tubular ones alone, on a flattened or slightly convex receptacle. The involucre surrounding each flower head is cylindric or campanulate, with its principal bracts in one series, distinct or slightly united at the base, and encircled very often with a ring of shorter scales. The achenes are mostly terete or compressed, sometimes curiously papillose. After wetting, these papilla put forth pairs of spiral hairs which secrete adhesive mucilage. The generic name has been derived from the Latin *senex*, an old man, in reference to the tuft of soft, plenteous bristles surmounting the achene, and mostly white. These parachutes have so well distributed the seeds of the common groundsel (*S. vulgaris*), originally European, that it is

SENEFELDER — SENEGAMBIA

found all about the civilized temperate zone as a troublesome weed. It is a more or less glabrate annual, about a foot high, with spatulate pinnatifid leaves and rayless yellowish heads in corymbs. It blooms at all seasons, and is often sold in English cities as food for cage-birds. At one time it was even regarded as a love-charm, and was said to have formed a part of the Virgin's bed. It was also of old repute for poulticing. *S. aureus* is a charming, slender, American species, with cordate basal leaves, called golden ragwort, and blooming in the spring. Squaw-weeds are other species of *Senecio*.

The section known as *Cinerarias*, having dark-blue rays, — a rare color among *Compositæ*, — are greatly cultivated and hybridized, but not many other *senecies* are valued in horticulture. Among these are the familiar German ivy (*S. mikanioides*), an easily propagated, rapidly growing, glabrous, twining vine, with small yellow flowers in axillary or terminal clusters, and glossy, deltoid-ovate leaves; and the Cape ivy (*S. macroglossus*), a beautiful greenhouse climber with golden flowers as large as marguerites and ivy-like leaves. One of the "dusty millers" is *S. cineraria*, a tall perennial, enveloped in white wool, and with small compact corymbs of rayless flowers. The handsome *S. pulcher*, with reddish-purple rayed flowers, of strong growth and cobwebby foliage; the great *S. japonicum*, over five feet high, and extremely ornamental, with its large palmate leaves, and large yellow flowers; and the *S. petasites*, valuable for its large panicles of big, yellow fragrant flowers, blooming in mid-winter, are also cultivated.

Senefelder, ză'ně-fě'l-dēr, **Aloys**, Bohemian inventor of lithography; b. Prague 6 Nov. 1771; d. Munich, Bavaria, 26 Feb. 1834. The son of an actor, in early life he tried unsuccessfully to be both actor and dramatist. Having learned something of printing he conceived the idea of inventing a process of his own, and was finally led by accident to his great discovery of lithography (q.v.). Subsequently he made important improvements, contrived a press, procured a patent, and set up an establishment, which he carried on successfully. In 1809 he was appointed inspector of the royal lithographing establishment. He published the 'Elements of Lithography' (1819), a curiously illustrated work, which he translated into English and French. Consult: Nagler, 'Aloys Senefelder und der Geistliche Rath Simon Schmidt' (1832).

Senegal, sěn-ě-gâl', West Africa, (1) a river which flows into the Atlantic near Saint Louis, the capital of the French colony of Senegal, in lat. 15° 48' N. It is formed by the union of the Hafing and the Bakhoi, at Bafulabé, the former rising in the Futa-Jallon mountains, southwest of Timbo, and the latter near Wosebugu. From the opposite or western side of the mountain in which the Bafing rises springs also the Falemé, another great branch of the Senegal, which runs north in a more direct course till it joins the united head streams above Bakel. The Senegal is about 1,000 miles long, and is navigable up to the cataracts of Félou in Kason, about 700 miles from its mouth. A river service from Saint Louis to Kayes, 460 miles, is maintained during the flood season, and a

railway line has been built from Kayes to Bafulabé (82 miles), and is being extended to Bamaku and Tulimandis on the Niger. The delta is marked by numerous *marigots* or channels which disperse its waters through the adjacent plains; and its mouth is dangerously barred, so as to be accessible only for small vessels in the dry season. Dredging operations are in progress to facilitate navigation. (2) A French colonial possession in West Africa named after the river and comprising the coastal strip from the British colony of Gambia north to Cape Blanco, and extending inland to the French Sudan military territories. The greater part of this region belongs to the district known as Senegambia (q.v.). By a decree issued in 1899 the colony of Senegal was extended so as to include the western part of the former French Sudan territory, and the area of Senegal is therefore now about 80,000 square miles. The whole is under a civil governor, who has direct jurisdiction in the communes of Saint Louis, the capital, on the coast, Dakar, the chief port, near Cape Verde, Goree, and Rufisque. Several other districts are under administrators, but the greater number of the inhabitants are only partially under the control of the French authorities. The colony is represented in the French chamber by one deputy. Dakar is fortified, and there is a military force of about 3,000 men, nearly one half of them natives. Millet, maize, and rice are cultivated by the natives; the natural products include gums, castor-beans, earth-nuts, cocoanuts, rubber, and kola. Cattle, sheep, goats, and camels are domesticated, and some weaving, pottery-making, and other industries are carried on. In 1900 the imports were valued at over \$9,000,000, and the exports, consisting chiefly of earth-nuts, gums, and rubber, at over \$6,500,000, the trade being chiefly with France, although steamers ply also to Liverpool and Hamburg. In 1901, 520 miles of railway line were open, the chief line being the coast line between Dakar, Rufisque, and Saint Louis. A line from Kayes, at the head of flood river navigation on the Senegal, to the Niger is well advanced. In the same year there were also 1,400 miles of telegraph and 40 miles of telephone line in operation. The French first settled Senegal in 1637. It was taken by the English in 1756, retaken by the French in 1779, and subsequently held by the English till the peace of 1814. The settlements did not flourish till the appointment of Gen. Faidherbe as governor in 1854. He began a vigorous line of action, subdued the Berber chiefs who prevented the French advance inland, and annexed their territories. This policy was pursued in the same spirit by subsequent governors; districts were annexed and protectorates proclaimed with extraordinary rapidity, though the two powerful chiefs Ahmadou and Samory occasioned a great deal of trouble, 1887-90. Pop. about 1,200,000.

Senegambia, sěn-ě-gām'bī-ā, West Africa, so named from the Senegal and Gambia rivers (qq.v.), an extensive region comprising the countries between lat. 10° and 17° N; lon. 4° and 17° 30' W.; bounded on the north by the Sahara, south by Guinea, and west by the Atlantic. The area is estimated at from 400,000 to 700,000 square miles, and is almost wholly under French influence, with the exception of

Bissagos Island, and some coast territory at the mouth of the Rio Grande River, belonging to Portugal, and the British Gambia colony at the mouth of the Gambia. The name Senegambia is not used by the French, who call their colony and protectorate Senegal (q.v.). The western portion of the country is a low, flat, and to a great extent swampy plain. East of this the country is mountainous, and the valleys run north and south. The principal rivers are the Senegal, the Gambia, the Jebe or Rio Grande, and the Nuñez. In the level tract bordering the coast the rivers during floods overflow their banks, inundating the plains, and become connected with one another by means of canals. On the lower Senegal, so far as the inundation reaches, vegetation is very luxuriant. Rice, maize, and other grains, with bananas, manioc, and yams, are cultivated equally on the hills and plains. The orange, citron, and other fruits introduced by the Portuguese are now extensively cultivated on the hills. Wild animals comprise the elephant, hippopotamus, monkeys, antelopes, gazelles, lion, panther, leopard, hyenas, jackal, crocodile, etc. The climate is intensely hot, and unhealthful for Europeans. The inhabitants are of many races, the principal being the Yolofo, Foola, and Mandingoes. These negro tribes inhabit for the most part Middle Senegambia, between the Senegal and the Gambia. Upper Senegambia, to the north of the Senegal, is largely inhabited by Moors, who carry on an extensive trade in gum, etc., with the Europeans. The total population is estimated at 12,000,000.

Senijextee. See SALISHAN INDIANS.

Senil'ity. See OLD AGE, DISEASES OF.

Senior, sē'nyōr, **Nassau William,** English political economist; b. Compton 26 Sept. 1790; d. Kensington Gore, London, 4 June 1864. He was graduated from Eton and from Oxford, and in 1819 was called to the bar at Lincoln's Inn. He was the first professor of political economy at Oxford 1825-30; was appointed a master in chancery in 1836, and resumed his chair at Oxford in 1847. Of his writings, which comprise a number of excellent treatises on political economy, mention may be made of 'An Outline of the Science of Political Economy' (1836); 'Political Economy' (1850); 'Essays on Fiction' (1864); and 'Historical and Philosophical Essays' (two vols., 1865).

Senlac, sēn'lāk, or **Hastings, Battle of,** the one battle in the Norman conquest of England. It was fought 14 Oct. 1066 at Senlac Hill, a few miles from Hastings, between William, Duke of Normandy, and Harold II. (q.v.), king of England. Harold's fortified position was attacked at 9 a.m. by the Norman army in three divisions, strong in cavalry and archers, the centre led by William in person. The English made a stout resistance with their battle-axes and other weapons, but part of them pursuing William's flying Bretons, the whole body was led into a trap by the feigned retreat of many of the Norman forces, the disordered ranks of the English being easily overborne by their enemies, who stormed and carried the hill. The death of Harold, who was pierced in the eye by an arrow about sunset, disheartened his men, and they shortly dispersed.

Battle Abbey was erected by William on the field where Harold fell, and portions of it still exist. Among the literary treatments of the event are two poems of Chatterton and a drama by Cumberland. Consult: Green, 'The Conquest of England' (1899); Freeman, 'Norman Conquest,' Vol. III. (1876). See WILLIAM I.

Senn, Nicholas, American surgeon: b. Buchs, Switzerland, 31 Oct. 1844; d. Chicago, Ill., 2 Jan. 1908. He was brought to this country when a boy and settled in Wisconsin. He was educated at the Chicago Medical College and the University of Munich, was house physician at the Cook County Hospital 1868-9 and practised medicine in Wisconsin 1869-93, being at one time surgeon-general of that State. After 1893 he practised in Chicago, where he was attending surgeon of the Presbyterian Hospital, and surgeon-in-chief of the St. Joseph's Hospital. He was appointed in 1898 chief surgeon of the 6th Army Corps, ranking as lieutenant-colonel of volunteers, and chief of staff in the field. From 1884-90 he was professor of surgery at the College of Physicians and Surgeons, Chicago, and after 1890 professor of practical and clinical surgery at the Rush Medical College. He was also professor of surgery at the Chicago Polyclinic, and lecturer on military surgery at Chicago University. Among his works are 'Four Months Amongst the Surgeons of Europe'; 'Experimental Surgery' (1889); 'Surgical Bacteriology' (1889); 'Principles of Surgery'; 'Tuberculosis of Bones and Joints'; 'Medico-Surgical Aspects of the Spanish-American War'; and a 'Nurse's Guide for the Operating Room' (1903).

Senna, a nauseous, bitter, but valuable purgative drug, obtained from the leaves of several tropical species of the leguminous genus *Cassia* (q.v.). The officinal species are shrubby plants, with nearly regular, five-merous flowers in racemes and alternate, pinnate leaves subdivided into many leaflets. Alexandrian senna is formed of the leaflets of *Cassia acutifolia*, which are dried by cutting the shrubs until the leaflets shrivel and tumble off, and are then exported from Nubia. *C. angustifolia* (*C. elongata*) grows in and about Arabia, where it was used in domestic practice by the Arabs, who were apparently the first to introduce the drug to Europe. It is called Indian senna, as it is cultivated in South India. Bombay senna is a very inferior quality of this variety, much mixed with stalks and dead leaves; the variety Tinnevely, on the contrary, is the largest and cleanest senna in commerce. *C. obovata*, formerly of good repute, producing senna-pods, and cultivated in India, is now classed among the inferior qualities, and rarely met with except as an adulterant. Still other sennas are known under the name of the port of export, or place of growth. American or wild senna is the *Cassia marylandica*, a perennial abundant in the southern United States, sometimes eight feet high, with obtuse, oblong leaflets, numerous yellow flowers, with clawed petals, and long linear pods. It has the qualities of oriental senna in a lesser degree, and was formerly used for the same purposes in popular medicine. Bladder senna is the *Colutea arborescens*, and is also a purgative sometimes called bastard senna.

Sennaar, *sē-nār'*, North Africa, a region extending between the Blue and the White Nile, from Khartum to Fazogl, or in a broader sense a province of the Egyptian Sudan. It covers an area of 40,000 square miles. Generally speaking, it is a broad plain with occasional granite mountain heights, and at the north steppes thickly overgrown by wild grass and bushes; at the southeast tall forests intersected by fertile valleys. Gold and iron occur, and palms, tamarinds, etc., grow on the plain. Monkeys, lions, gazelles, giraffes, elephants, besides marsh and water-birds, are numerous; also domestic animals. The chief occupation is fishing. The products are rice, grain, melons, tobacco, sugar, senna, ebony, and sandal-wood. The climate is exceedingly warm, and during the rainy season unhealthy. The inhabitants are negroes—the Fundj, Nubian, and Galla, and of mixed races, and are sometimes classified according to color. Slaves are imported. Sennaar (pop. 10,000), the former capital, stands on the Bahrel-Azrik or Blue Nile. The other towns are Fazogl (or Famaka), Roséres, Wod-Medineh, and Khartum. Near the latter town are the extensive ruins of Soda, the ancient capital of the Funj.

Sennacherib, *sē-nāk'ē-rīb*, an Assyrian king, son of Sargon, succeeded his father on the throne 705 B.C. Among his first acts as king was the suppression of the revolt of Babylonia, and after accomplishing this he directed his arms against the Aramean tribes on the Tigris and Euphrates, of whom he took 200,000 captive. He then reduced a portion of Media, till then independent; placed under tribute Tyre, Aradus, and other Phœnician cities; advanced against Philistia, made war upon Egypt, and finally marched against Hezekiah, king of Judah, who had revolted. Hezekiah, terrified, yielded in a panic, and paid the tribute exacted, namely, 300 talents of silver and 30 talents of gold. On his return to Assyria Sennacherib made another attack on Babylonia, and afterward reinvaded Judah. Having marched through Palestine he laid siege to Libnah and Lachish, and finding that his messengers Tartan, Rabsharis, and Rabshakeh had failed in obtaining the submission of Hezekiah, he wrote an intimidating letter to Hezekiah; but before he could bring his forces against the city, according to the Bible record, a visitation from the Lord during the night caused the death of 185,000 of his troops. In consequence of this calamity Sennacherib returned to Nineveh and troubled Judah no more. From Herodotus we learn of the Egyptian tradition regarding the destruction of Sennacherib's host, which is, that a multitude of field mice, devoured all the quivers and bowstrings of the enemy, and gnawed the thongs by which they bound on their shields. No mention of the destruction of his host is found in the monuments of Sennacherib. Sennacherib was one of the greatest of the Assyrian kings, and was not only a great warrior but also a great builder. His greatest architectural work was the palace of Koyunjik, which covered an area of fully eight acres. Of the death of Sennacherib all that is known is contained in the brief Scripture statement of 2 Kings xix. 37 and Isa. xxxvii. 38, from which it appears he was murdered by his own sons.

Bibliography.—Rogers, 'History of Baby-

lonia and Assyria' (New York 1900); 'Records of the Past,' Vol. VI, new series (London 1892); E. Schrader, 'The Cuneiform Inscriptions and the Old Testament' (I, 278-310); Tiele, 'Babylonisch-assyrische Geschichte' (Gotha 1885); the 'Annals of Sennacherib,' and the 'Babylonian Chronicle,' in 'Keilinschriftliche Bibliothek,' Vol. II. (Berlin 1890). See ASSYRIA; ASSYRIOLOGY; BABYLONIA.

Sens, France, archiepiscopal city and capital of an Arrondissement in the Department of Yonne; situated on the right bank of the Yonne River, 70 miles southeast of Paris. The city contains the Cathedral of Saint Étienne dating from the 12th century, and a fine city hall, which contains also a museum of precious stones, a library, and an art gallery. Manufactures consist chiefly of fertilizers, farm implements, leather, glue, serge, etc., and there is considerable trade in wine, corn, hemp, and flax. Sens was known in ancient times as *Agenticum*, and later as *Senones*, and was one of the largest cities of Gaul, vestiges of the old Roman walls still being visible. Pop. 14,962.

Sensation. This term is used broadly to designate any form of consciousness which originates immediately from the stimulation of the sensory end-organs of the nervous system, (*e. g.*, the eye or ear). This usage fails, however, to distinguish between sensation and sense perception. In the narrower psychological meaning sensation applies to the *elementary* forms of consciousness originating under the conditions mentioned. Sensations are in this technical sense cognizant of simple sensuous *qualities*, such as color, tone, etc. (some 40,000 or more simple qualities can be discriminated), whereas perceptions are cognizant of *objects*. For example, we perceive a sunset, a complex visual object displaying various color qualities, *e. g.*, whiteness, redness, etc., of which we become conscious as sensations. These sensations are regarded as simple and incapable of further analysis. We perceive a musical sound when a note is struck upon the piano. This sound is made up of a simple fundamental tone and its overtones. Our consciousness of one of these simple pure tones is a sensation. On these terms sensation is evidently largely an abstraction of the psychologist. Our actual sensory consciousness is commonly cognizant of objects, *i. e.*, is perceptual.

Certain authors extend the meaning of sensation so as to include not only all elementary sense qualities arising directly from sensory stimuli, but also all such qualities when aroused in processes of imagination, as when, for instance, one closes the eyes and gets a visual image of a rose. They speak therefore of peripherally and centrally originated sensations. In so far as this usage calls attention to the fact that the sensory and ideational *elements* are qualitatively alike, whether called out by central or peripheral stimulation, it is justifiable. But well-established custom is violated by the procedure and it may be questioned whether it will endure.

The commonly recognized groups of sensations are as follows: color, including brightness, sound, taste, smell, pressure, heat, cold, pain, articular, tendinous, muscular, thirst, hunger, sex, circulatory (including tickling, itching,

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etc.), respiratory and static (dizziness sensations from the semicircular canals of the ear).

Psychologists are wont to treat sensation under four principal aspects, *i. e.*, quality, duration, intensity, and extensity. Of these four quality is generally considered most basal. A sensation of tone, for example, may vary in duration without appreciable alteration of the pitch, which constitutes its most essential quality. Again, a color sensation may under certain conditions vary in extent without noticeable variation of quality. But a sensation which had no duration or no intensity would obviously be no sensation at all, and in general, if any aspect which a given sensation can manifest be reduced to zero, the whole sensation vanishes. Certain psychologists maintain that every sensation possesses all these aspects, but probably the majority hold that auditory sensations at least, and perhaps a few others, like smell, are lacking in extensity. Certain interesting facts concerning the relations of sensation intensities to one another are formulated in Weber's and Fechner's laws. According to Weber equal differences in sensation intensity are produced by relatively equal differences in stimulus intensity. If we place a weight of 20 grams upon the hand, we shall notice no change until we have added another whole gram *i. e.*, $\frac{1}{10}$ of the original stimulus. If we take a weight of 100 grams, we must now add not one gram but $\frac{1}{10}$ of 100 grams or 5 grams, before we notice a change. The same sort of relation holds for a number of the senses within the medium ranges of intensity.

Sensations depend upon the stimulation of specific end-organs connected with specific brain centers. No one ever gets visual experiences who does not possess an optical center in the cerebral cortex and who has not at some time possessed a functioning retina. No one ever gets auditory experience without a similar use of the ear and the auditory cortex, and the same sort of thing is true for each of the sensations.

The stimuli which produce sensation are classified as adequate and inadequate, internal and external, mechanical and chemical. The only pair which requires any explanation is the first. Each sense organ is fitted to respond primarily to some special form of physical stimulus, *e. g.*, the eye to light, the ear to sound, etc. Such stimuli are called adequate. In addition to these adequate stimuli, however, the senses can be aroused by other forms of stimulation designated inadequate. Thus an electric current conducted to the frontal region of the head may produce sensations of light. Pressure on the eyeballs similarly occasions color sensations. It may be added that sensations often continue after the stimulus is removed. Such sensations are known as after-sensations. In the case of vision they present very remarkable characteristics and are commonly called after-images.

Sensations combined in various ways and reinstated in the form of memory and imagination furnish the basis of all our ideas. They are accordingly the foundations upon which rests the whole structure of knowledge. To understand their function in this particular it must be borne in mind that in actual experience they are not mere naked qualities, but that they serve to convey meanings and that it is in this manner that they achieve fundamental import for mental life.

Bibliography.—James, 'Principles of Psychology'; Külpe, 'Outlines of Psychology'; Bain, 'Senses and Intellect.' For special senses see literature of special articles, VISION, ORGANIC SENSATIONS, etc.

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Sensation, Organic. The term organic sensation is nowadays applied broadly to all those sensations which originate from internal bodily stimulations. They are called forth by mechanical, chemical, and thermal changes in the organism. Among the sensations which are commonly held to belong to this group may be mentioned pain, pressure, and temperature from the interior of the organism; sensations from the muscles, tendons, and joints; sensations from the alimentary canal; sensations from the circulatory, respiratory, and sexual organs; and finally sensations which are supposed to originate from the semicircular canals of the internal ear. These sensations are sometimes distinguished from the other forms of sensation like vision and hearing on the ground that they convey to us primarily a knowledge of the state of our own organism rather than knowledge about the external world. This distinction is, however, only roughly accurate.

The sensation qualities which originate from these senses can be described only with approximate accuracy, for psychological analysis has not succeeded as yet in unravelling all their complexities. Pain, pressure, and temperature are familiar experiences requiring no description. From the muscles we obtain sensations which suggest dull pressure, becoming under conditions of fatigue somewhat unpleasant and in conditions of cramp leading to distinct pain. From the tendons we obtain sensations which inform us of the movement of our limbs and particularly sensations of strain and resistance. It is generally held that from the joints we receive important sensations which also inform us of the movements of our limbs and in particular make us aware of their position. Certain authorities have called in question—both on anatomical and psychological grounds—the significance of the articular sensations. These sensations from muscles, tendons, and joints commonly occur together and are sometimes spoken of in a group as the 'muscle sense' or the kinæsthetic senses. Experimental devices are necessary in order to isolate them from one another. The circulatory processes are probably responsible for such subjective sensations as feverishness, shivering, 'pins and needles,' itching, tingling, and tickling. Of course certain of these sensations are at times called forth by direct external causes. The heart itself occasionally gives rise to very distinct sensations, commonly of a painful character. The respiratory organs are probably responsible for our feelings of suffocation, of 'stuffiness' and closeness as well as for those of freshness and stimulation in the air. The alimentary canal occasions at least three specific qualities: hunger, thirst, and nausea. Undoubtedly the processes of secretion and excretion affect the general tone of consciousness from time to time, although, with the exception of the sexual organs, it is difficult to say whether they produce any real sensations apart from those already mentioned.

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The respiratory, circulatory, alimentary, and sexual sensations are sometimes spoken of as the 'vital sensations.'

The semicircular canals together with the vestibular portion of the internal ear are commonly regarded as responsible for our impressions of the movement of the body as a whole; but it seems certain that under ordinary conditions other senses contribute to these impressions, and only in the case of dizziness is it at all clear that the sensations themselves are different from those hitherto mentioned. It is in any case reasonably certain that these organs constitute part of a reflex system by means of which the bodily equilibrium is maintained.

The term common sensation, or sometimes common feeling, has been applied more or less indefinitely to this whole organic group of sensations with special reference to the fact that our general feelings of vigor, health, discomfort, depression, and so on depend upon them. When these terms are used at present they are more commonly applied to sensations like pressure and pain, which are conceived as widely distributed over the body and therefore as more or less common to the impressions gained from various sense organs.

Organic sensations are undoubtedly dependent like other sensations on the stimulations of sensory end-organs connected with centripetal neural pathways leading to the brain. These end-organs instead of being placed upon the surface of the body, like those of the more familiar senses, are imbedded in the various deep-lying tissues of the organism. A marked peculiarity of many of these sensations is their tendency to set up massive, wide-spread irradiating effects often quite remote from the seat of stimulation. This is probably brought about by means of the intimate connections of many of these organic sensory nerves with the sympathetic nervous system. This is less true of the kinæsthetic sensations and certain forms of pressure than of the remaining members of the group. Pain affords many striking instances.

The organic sensations play an extremely important part in the phenomena of feeling and emotion. In such emotions, for example, as fear and anger it is clear that a large part of the content of our feeling is made up by sensations of this character, *e. g.*, sensations of tingling or flushing which come from circulatory changes in the skin, painful sensations from the region of the heart, sensations of choking which come from the respiratory passages, sensations of trembling which come from the motor mechanisms, and so on. The James-Lange theory of emotion, whose essential contentions are now for the most part generally admitted, makes the reflex stimulation of these organic sensations the cardinal fact in emotion whereby it is distinguished from other forms of consciousness.

These sensations are also held to possess distinct significance for the processes of memory and recognition. It is thus maintained by certain authorities that the characteristic psychological process when we recognize a familiar object is found in the arousal of certain of these organic sensations which are called forth by familiar objects, whereas a different set of organic qualities is aroused by unfamiliar objects. It seems fairly certain in any event that the

process of recognition is characterized by the presence of a definite mood, and the specific qualities of our various moods are by general consent of psychologists determined by the presence of definite organic sensations.

Ribot and others urge furthermore the existence of 'affective memory.' By this they mean that in addition to our ability to recall ideas and in addition to our ability to remember whether any given past experience was agreeable or disagreeable, we possess the capacity actually to reinstate in some measure the original affective coloring of a past experience. This is brought about, they maintain, either by our capacity freshly to arouse the organic sensations which originally belonged to the experience, or by our ability to arouse the images or mental copies of these sensations. Certain psychologists deny the existence of these images. Without attempting a discussion of the merits of this doctrine it is safe to say that individuals vary vastly in the degree to which they actually possess this capacity of fresh arousal of either the organic images or sensations characterizing a former experience.

Aside from the particulars already mentioned organic sensations possess small value for the cognitive side of mental life. They bring us relatively little exact knowledge and in conditions of health come only infrequently to clear consciousness. On the other hand they are ordinarily marked with distinct feeling-tone, are definitely agreeable or disagreeable. Under conditions of health they seem to afford the basis of our feeling of well-being, a feeling which is sometimes vivid but usually dim and vague. They are very disagreeable and painful when the bodily processes are overtaxed or disturbed in any way and it is in connection with such experiences that we most often find them coming distinctly into the foreground of the mind. The discomfort of indigestion, extreme fatigue, and headache will illustrate the point.

Although their value for our knowledge processes is small, their significance for the life of impulse and volition is tremendous. The two great impulses represented by hunger and sex may suffice to illustrate this side of the subject. All our processes of will and the whole substructure of character are honeycombed with influences which originate in these impulses, and the impulses themselves are but the motor expressions of stimulations from organic sensations.

Bibliography.—Beaunis, 'Les sensations internes'; Titchener, 'Outline of Psychology'; Ebbinghaus, 'Grundzüge der Psychologie'; Stout, 'Manual of Psychology'; Bain, 'Senses and Intellect.'

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Sensa'tionalism, in philosophy, the doctrine that our ideas originate solely in sensation and consist of sensations transformed. Locke has been classed with Condillac and other philosophers of the 18th century as holding the doctrine of sensationalism; but Locke teaches that "all human thoughts, even the most complex and abstract, are due to experience": they are all made up of "simple ideas," and are due to phenomena of which we are percipient in

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the five senses, or else they are due to reflexion on "the operations of the mind." Condillac most distinctly refers all ideas to sensation. He supposes a statue organized within like a man, but as yet without sensibility. He endows this statue with one sense after another till it becomes perfectly a human being, and holds that it then would possess exactly the same ideas as ourselves, though in its first state it had no ideas.

Sense-organs. See ANATOMY, COMPARATIVE.

Senses, special faculties of sensation by means of which the mind obtains knowledge of external objects and phenomena. The senses, five in number, are touch, taste, smell, sight, and hearing. The four last named are operative because of special organs connected by special nerves with the brain. As to touch, while there are special organs, it is an unsettled question whether tactile sensations are conveyed by special nerves or by the ordinary sensory nerves of the skin. The organs of sense are in reality working tools of the brain, and depend upon the alertness of the brain for efficiency. It is in fact the brain that sees, hears, etc. As sight, hearing, and touch seem to be most concerned with the wants of the intellect, they are sometimes spoken of as the intellectual senses; while taste and smell, being intimately connected with nutrition, are known as the corporeal senses.

Cultivation of the senses, especially if begun in early life, will develop their usefulness. It produces the accurate hearing of the musician, the keen eyesight of the pilot, engineer, and expert microscopist, and the accurate touch of the blind. But training may be carried to such an extent as to make these senses sources of misery. Certain persons are painfully conscious of the slightest discord; others almost instantaneously detect, with a feeling of disgust, the inharmonious blending of tints which, to the average person, are all in harmony; still others are made uncomfortable by an odor perceptible to none but themselves. All the senses become accustomed to continued impressions, so that they no longer perceive their existence. This condition may prove a source of danger, for one may, for example, become habituated to harmful odors. Sense-education of the feeble-minded, as accomplished by Seguin and his wife, by "constant, assiduous, philosophical training," is a noteworthy achievement. It seems to be a rule, with but few exceptions, that when one sense is lost or seriously impaired nature sharpens some other.

Touch, or tactile sensibility, enables us to appreciate by actual contact, the size, form and consistency of objects and the character of their surface. It is most sensitive in the margin of the lips, tip of the tongue, palms of the hands, and under surfaces of the fingers. Some writers speak of "general sensibility" as one of the senses, and include under this term, touch, muscular sense or the sense of pressure, sense of temperature, etc. The organs of touch are end-bulbs and tactile corpuscles. See MUSCLE-SENSE.

Taste enables us to discover and recognize flavors. This sense resides in the tongue, soft palate, uvula, pillars of the fauces, tonsils, and the upper part of the pharynx. The organs of taste are taste-buds and various papillæ. The nerves of taste are the gustatory branch of the

fifth pair of cranial nerves and the lingual branch of the glosso-pharyngeal nerve. Only those substances can be tasted which are dissolved, and at the same time the mucous membrane of the mouth must be moist.

Smell is the sense by which odors are perceived. The olfactory nerve is, like the optic nerve, a prolongation of the cerebrum. The olfactory bulb is at the anterior extremity of the olfactory nerve (more strictly the olfactory tract), of which it is an enlargement, and the development of the bulb bears direct relation to the acuteness of smell. In some animals, in which smell is very acute, the bulb is of such size that it is called the olfactory lobe. In man the impressions of this sense often need to be confirmed through other senses. Odors, to be recognized, must be presented in a gaseous or vaporous form. Dryness of the mucous membrane of the nose and excessive secretion blunt the sense of smell. Some persons are so susceptible to odors and emanations that the smell of certain substances, as of roses, new-mown hay, etc., or of certain powdered drugs, may excite in them an inflammation of the nasal passages. Hay fever (q.v.) is one form of such inflammation. There is an intimate relation between smell and taste. Delicate flavors are not appreciated when the nose is obstructed, as by catarrh, etc., or in cases of anosmia (q.v.), loss of the sense of smell. Smell influences the respiratory process, and the breathing of a fine odor increases the amplitude of the respiratory movements. The sense of smell may be highly developed, especially where there is deficiency in other senses. By it certain blind and deaf persons are able to recognize any one with whom they have previously come in contact. This delicate sense is impaired by oversecretion of the nasal mucous membrane (catarrh), by its dryness or its frequent irritation, and may be destroyed by disease or injury.

Sight is the faculty whereby we receive impression of light, movement, form, size, shades of color, and the manifold beauties of nature and art. The organ of sight is the eye, the nerve of sight, the optic nerve. Necessary also to proper vision are the eyebrow, eyelid, eyelashes, lachrymal and Meibomian glands, tear-passages, and certain muscles. Clear vision depends on the focusing of rays of light through clear media upon the retina, and the conveyance of impressions so brought to the cerebrum by means of the optic nerves. Defects in vision are color-blindness, myopia, presbyopia, hypermetropia, astigmatism, etc.

Hearing is a sense whose organ is divided into three parts, external, middle, and internal. The latter is essential, the others are accessory. Hearing is effected by means of impressions made by the vibrations of elastic bodies (ordinarily the atmosphere). Impressions of sound-waves are conveyed through the complex apparatus of hearing to the auditory nerves, and through them to the brain. Any interference with the delicate mechanism of the auditory apparatus, as by inflammation or injuries, blunts the sense of hearing. See ANATOMY, COMPARATIVE; NOSE; NOSE AND THROAT; SALIVARY GLANDS.

Sensitive Plant, or Humble Plant, an herb (*Mimosa pudica*) of the order Leguminosæ, a

native of Brazil, where it is probably a perennial. It is an erect spiny or hairy plant with long-petioled pinnate leaves and numerous purplish flowers in roundish heads, followed by spiny, jointed pods. It is naturalized in many warm countries, and is cultivated as a curiosity in greenhouses and as a summer annual in gardens. The seeds are sown in early spring in any good garden soil and given ordinary care. The plants are chiefly interesting because of the movements of the leaves when touched. If only lightly touched the leaflets close in pairs, but if more roughly the petioles become depressed. Young foliage responds more quickly, the movement usually occurring within one second after contact. In a few minutes the leaves gradually resume their former expanded position, the time required depending upon the age of the foliage, the warmth of the atmosphere, etc. At night the plants "go to sleep," that is, the leaves become depressed as after contact. Other species of *Mimosa*, especially *M. sensitiva*, a semi-climber, are also somewhat sensitive to touch.

Sensory Area, a portion of the brain in which the terminals of the sensory nerve-filaments finally end, constituting the cerebral centres of sensation. The location of the general sensory area is by no means definitely known. There are a number of sensory areas: thus the area for the sensations of sound is located in the superior temporal convolutions of the brain, and destruction of this area prevents the patient not from hearing save when both auditory centres are destroyed, but from the intellectual appreciation of what is heard. The sensory area for sight is located in the occipital region; for smell in the brain-base. The general feeling sense-area, however, the so-called sensory centre in the brain, is thought to lie below the motor area, somewhat overlapping it. It will probably be many years before the exact limits of the various areas in which the different sensory axones terminate are known. When that time does come, however, the student of the diseases of the mind will be in a much better position to understand the different variations in personality as shown in diseases of certain areas. Consult: Flechsig, 'Gehirn und Seele'; Barker, 'The Nervous System.'

Sentence, in law, is a judgment pronounced by court or judge on a criminal, being the final determination of the court through a judicial decision, publicly and officially declared in a criminal prosecution. It is not the discretionary act of the court, but the judgment of the law, which it is the ministerial duty of the court to pronounce.

Sentimental Journey Through France and Italy, A, a work by Lawrence Sterne, published in 1768, ostensibly of travel and observation. Around a central character, definitely conceived and depicting to a large extent the author himself, are grouped a number of incidents more or less actual though embellished by the author's fancy. It has served as a model for many subsequent imitations.

Sentimental Tommy, a novel by J. M. Barrie, published in 1896. It details the life and development of a young writer and is taken to contain considerable autobiographic material. Its sequel is 'Tommy and Grizel' (1900).

Seoul, sé-ool', Sōul, or locally **Han-yang**, Korea, the capital of the country, on the river Han, about 70 miles by water from its mouth in the Yellow Sea, and 25 miles by rail from Chemulpo, its seaport. The city proper is a short distance from the river, in a basin partly surrounded by heights, and enclosed by a wall. The streets are narrow and dirty, and the native houses low and mean. The royal palace is the chief edifice, and with its grounds occupies over 500 acres enclosed by a lofty wall. Seoul is the seat of various foreign embassies; a Roman Catholic cathedral is the principal European building. Silk, paper, tobacco, mats, fans, and similar commodities are the principal products of native industry. There are schools for the teaching of Japanese, French, Chinese, Korean, Russian, and English, and an American Mission School, which is subsidized. Seoul is connected with all the open ports of Korea by telegraph. Pop. about 200,000, or with the extensive suburbs, 300,000. The foreign population numbered 22,000.

Separate Estate. See LAW OF HUSBAND AND WIFE.

Separatist Society of Zoar. See ZOAR, SEPARATIST SOCIETY OF.

Separation. See LAW OF HUSBAND AND WIFE.

Se'paratists, in Church history, (1) Those who in the reign of Queen Mary of England refused to conform to the public services of the Roman Catholic Church. Among them was Mr. Rose, who was apprehended with 30 of his congregation while celebrating the Lord's Supper in Bow-church Yard, London. Another well-known Separatist was Mr. Rough of Islington, who with several others was burned at the stake by order of Bishop Bonner. (2) In Ireland the Separatists were numerous, consisting chiefly of the Walkerites, founded by the Rev. John Walker, who seceded from the Established Church of Ireland and founded a small church in Dublin, with the doctrines of the Sandemanians (q.v.) as their creed. Other Irish Separatists were Rev. Mr. Kelly and his adherents who left the Established Church and formed an individual and independent Sandemanian communion. The Darbyites of Ireland were Separatistic Millenarians from whom sprang the Plymouth Brethren. (3) The German Separatists seceded from the Lutheran Church in the 18th century and founded a Pietist sect in Württemberg. Persecution drove them to emigration and they settled under George Rapp (q.v.) in Pennsylvania, where they founded the Harmony Society, calling themselves Rappists. Those who remained in Germany established themselves at Kornthal, under the name of Kornthalites. All who in Germany refused to conform to the German Evangelical Union, founded by Frederick William III. of Prussia, were also known as Separatists. (4) The name was taken by some of the early Puritans such as the Traskites (q.v.). They were subsequently represented by the Quakers. Among the most important sects which have assumed this name are the Separatists of Zoar, a village of Tuscarawas County, Ohio. Their constitution is strictly communistic; they refuse to serve as soldiers; consider celibacy a higher life than

marriage; reject all religious ceremonies, while maintaining the cardinal doctrines of Christianity. Although their numbers are considerably under 1,000 they enjoy great prosperity; but, belonging as they do to the peasant class of Germany, are simple and uncultured. They have neither audible prayer, nor anything that corresponds with the office of a preacher or minister in their public services. Consult: Gardner, 'Faiths of the World.'

Se'pia. See CUTTLEFISH.

Se'piolite, a compact, clay-like mineral of smooth feel; hardness 2 to 2.5; specific gravity 2. Owing to its porous nature it floats on water when dry. Color white or slightly tinted gray, yellow, red, or green. It is a hydrous silicate of magnesium, $H_2Mg_3Si_2O_{10}$. Extensive beds in Spain are utilized as a building stone. The mineral from Morocco is used in Algeria as a substitute for soap. It occurs as a secondary mineral derived from magnesite in the plains of Asia Minor, in alluvial deposits. The mineral from these deposits, popularly known as "Meersch-chaum" (q.v.), is used in the manufacture of tobacco pipes.

Sepoys, sē'poiz, or se-poiz', the name given in India to the forces composed of natives, disciplined after the European manner. The French were the first to see that the transportation of troops from Europe to their Indian colonies would be too expensive, and that Europeans would perish in great numbers by the exposure at sea and in the climate of India. They therefore took Hindus into pay, and the English adopted the same policy. In 1900 the total strength of the native army in India was 155,249, and that of the European was 73,638. Though not generally equal in courage and dexterity to European soldiers, the Sepoys are hardy and capable of enduring much, and very temperate in their food.

Sept-foil, a typical figure in Roman Catholic Church worship composed of seven equal segments of a circle, used to denote the number of the sacraments, gifts of the Holy Ghost, etc.

September, the ninth month of the modern year, but the seventh of the old Roman year, which began in March. It has always contained 30 days. See CALENDAR.

Septem'brists, in French history, the name given to the agents in the massacre which took place in Paris on 2 and 3 Sept. 1792, during the French Revolution. The numbers that perished in this massacre have been variously given; but the term has become proverbial throughout Europe for all that is bloodthirsty and malignant in human nature.

Septen'nate Act, The. In the German parliamentary elections of 1887 the struggle centred around the septennate, or seven-year army period. On 14 January the emperor dissolved the Reichstag and ordered new elections to take place. The government had proposed the addition of 40,000 men to the standing army, and sanctioned the maintenance of the present military force for another septennate. No previous army grant had been for more than two years. Prince Bismarck favored the measure. The emperor said, "The septennate means peace. Reject it and there will be war." But

the delegates voted the supplies for three years only, and the chancellor, by a decree from the throne, dissolved the house. The government secured a majority of about 40 votes in the general election, 1 Feb. 1887, and on 11 March the new Reichstag passed the septennate bill.

Septicæ'mia. See BLOOD-POISONING; PY-ÆMIA.

Septuagesima (sēp'tū-a-jēs'i-ma) **Sunday**, the third Sunday before Lent, so called from its being about 70 days before Easter (*septuagesimus*, 70th).

Septuagint, sēp'tū-a-jint, the oldest Greek version of the Old Testament. Although nothing is positively known of the origin of the Septuagint it is accepted as probable that we owe the work, also called the LXX., the Alexandrine Version, the Version of the Seventy, etc., to some Alexandrine Jews, who, having lost the knowledge of the Hebrew, caused this translation to be made by some of their learned countrymen, for the use of the synagogues, and called it the Septuagint from the great sanhedrin of 72 members. It dates from the 3d century B.C. At first only the Pentateuch was translated; and the version of the remaining books of the Old Testament was accomplished gradually, the whole being finally completed in the 2d century B.C. From the varieties of style evinced in the version it is clear that there must have been several translators, though how many it is impossible to ascertain. The language of the LXX. is the Hellenistic Greek of Alexandria, based upon the Attic dialect. The most skilfully executed portion of the Septuagint is the Pentateuch, next to that the book of Proverbs. The execution of the Psalms and Prophets is very indifferent. Of the Prophets the version of Jeremiah is the best, and that of Daniel the poorest. It is inferred regarding the Hebrew MS. or MSS. from which the version was made, that the letters were substantially the same as the present square characters, that there were no vowel points, no separation into words, no final letters, and that the words were frequently abbreviated. From the harmony found to subsist in a multitude of instances between the Septuagint and the Samaritan version, it has been surmised that the latter was the basis of the former; but the enmity existing between the Jews and Samaritans militates against this hypothesis. To explain the resemblance between the two versions Gesenius supposes them both to proceed from a common recension of the Hebrew Scriptures, and other hypotheses have been made. The Septuagint is the original of every ancient version of Scripture with the exception of the Syriac Peshito and the Samaritan. It was the sole standard of authority during the first four centuries, and has been the Bible of the Eastern Church from the first. Of 350 direct quotations in the New Testament from the Old Testament, scarcely 50 are found which differ materially from the Septuagint. It does not appear, however, to have obtained general authority so long as Hebrew was understood at Alexandria, nor can it be proved to have been commonly substituted by the Jews for the original in the synagogue service at an early period. It was, however, adopted by Philo and Josephus, and was universally received by the early Christians. In the transcription of the Septuagint, of which numerous copies were made,

SEPULCHRAL ARCHITECTURE — SEQUOIA

a great number of mistakes crept into the text. The task of rectifying it was undertaken by Origen, and the version as amended by him finds a place in his Greek Hexapla. The Septuagint is of undoubted value to the Bible critic, though the translation is not always literal, and misapprehensions of the meaning of the original are frequent. Glosses are very often inserted, and arbitrary paraphrases are numerous. The principal extant MSS. known are the Codex Alexandrinus in the British Museum, the Codex Vaticanus in Rome, and the Codex Sinaiticus (imperfect) in Saint Petersburg. The principal printed editions are the Complutensian (1517), the Roman or Sixtine (1587), the Oxford of 1707-20, the Oxford of 1798-1827 (Holmes-Parsons, five vols. folio), and the Cambridge edition by H. B. Swete (1887-94; 2d ed., 1895-9, three vols.). The Septuagint, which had been used by Jews and Christians long after Christ, was gradually superseded by other Greek versions, such as those of Aquila, Theodotion, and Symmachus, representing more closely the Hebrew text as it latterly stood, but only small fragments of these now exist. There is a Concordance to the Septuagint by Hatch and Redpath. See BIBLE.

Sepulchral Architecture, a form of art whose purpose is to give beauty or magnificence to tombs or to buildings used only for purposes of sepulture. The term may be extended to represent even the ornamental treatment of headstones or slabs. No particular style of architecture belongs strictly to sepulchral structures; the fashion being largely derived from the styles of civic or religious buildings prevailing at the period. Some styles, it may be said, lend themselves more readily than others, at least for splendor of effect. Such for instance is the Gothic, in which style many beautiful specimens exist, particularly in the cathedrals and abbeys of England. In this style is the sepulchral church of Brou at Bourg-en-Bresse. A distinction is here to be noted between the practice of ancient and mediæval times. In the case of the former the tomb was a building, large or small, apart from structures devoted to the uses of religious worship. The pyramids of Egypt were the most imposing of all human structures; the Mausoleum at Halicarnassus one of the wonders of the ancient world. The buildings erected in memory of the Mohammedan rulers in northern India as well as the Taj Mahal are to be taken with the foregoing as not strictly tombs, but as belonging to the domain of sepulchral architecture. Of all the Aryan peoples the Romans were conspicuous for their imposing tombs, specimens of which exist in the remains of the tomb of Cæcilia Metella and the Mole of Hadrian, now called the Castle of Saint Angelo at Rome. Belonging to the period of the Renaissance are the tombs of the Medici erected by Michelangelo, though of these the sculptural features are more important than the architectural. One of the most perfect specimens of this period is the tomb of Loys de Brézé, erected by his wife Diane de Poitiers in the cathedral of Rouen, and attributed to Jean Goujon and Jean Cousin. In America the most notable specimen is the tomb of Gen. Grant, a structure resembling in general form the tomb of Cæcilia Metella. A comparison of some of the specimens here quoted with the examples of civic and ecclesiastical architecture of the same period will reveal no dif-

ference in general style; the difference will enter only into the plan of the structure as a consequence of the fact that the building is to be adapted to no practical uses. The freedom thus offered to the designer will result in products of good or bad taste according as the period is one possessing high or low artistic ideals. See MEMORIAL ARCHITECTURE OR MONUMENT.

Sequin, sē'kwīn or sēk'īn, an Italian and Turkish gold coin. It was first struck at Venice about the end of the 13th century, and afterward in all the other Italian cities, and from the Levant was introduced into Turkey. The Tuscan sequin is worth \$2.30, the Turkish from \$1.10 to \$1.75.

Sequoia, a genus of *Coniferae*, included in the sub-family *Taxodioidæ*, of which the other genus is the *Taxodium* or deciduous cypress. The *Sequoia* genus (named in honor of the Cherokee chief Sequo-yah, who invented the alphabet of that tribe), was for a time known as *Taxodium* or *Wellingtonia*; it comprised two species, *S. sempervirens*, the redwood, and *S. gigantea*, the "big-tree," both natives of California. The genus was once widely distributed, as fossil remains testify, and the petrified forest in Arizona is stated to be composed of species of *sequoia*. The flowers of the *sequoias* are monœcious and are borne in scaly inflorescences as terminal or axillary shoots in such great profusion, that the pollen covers the ground beneath the trees during their winter blooming. The pistillate flowers mature into a fruit, or oval cone, having persistent woody scales, broadened at their outside end into a rhomboidal flat top, very much wrinkled, and with a slightly prickly-tipped apex. Their scales are slightly separated to allow the many brown, compressed seeds to escape and then spin away on their lateral wings. The leaves are acute, compressed and keeled, decurrent on the stem, alternate and inserted in spirals, very scale-like on the branchlets, but on older branches, linear and spreading.

The redwood, which was the first *Sequoia* discovered, is the more common species, and grows along the Pacific coast just so far inland as the sea-fogs can go. It is a very straight, handsome tree, with columnar trunk, and spreading branches and branchlets, and reaches in some instances as great a height as the other and more famous species (see REDWOOD).

Sequoia gigantea, the "big-tree of California," is more rare. It is found in 10 small groves, forming an uninterrupted "belt" extending for 200 miles on the western slope of the Sierra Nevada Mountains, and nowhere else in the world. The Calaveras grove near the northern extremity of this series, is the most picturesque and important group of big trees, and was first discovered by J. Bidwell in 1841. These famous trees are the most massive of any in the world, but are not the tallest, being surpassed by the *Eucalyptus* trees of Australia. They are practically exempt from disease, and, if they were not injured by fire and by man, would have apparently an almost endless life. Some of them are judged, by the number of annual rings, to have been thousands of years old. Fully grown trees average a height of 275 feet, and a diameter of 25 feet. One of the most gigantic, cut down, with great difficulty, in 1853, was 302 feet in

SEQUOYA LEAGUE — SERAPEUM

height, 96 feet in circumference, and after the bark was removed (which was itself nearly 18 inches thick, the diameter of the solid wood in the stump was 25 feet, 6 feet from the ground. This stump was used as a dancing floor, holding 40 or more persons. Others have been estimated as between 350 and 400 feet high.

The younger sequoias are very graceful, and charming in their dark blue-green foliage, being often grown in English and European parks. They have a straight, tapering stem from which the branches spring to form a narrow spire-like pyramid. After a few hundred years they begin to lose their branches, and become dome-like. Ultimately they become our picturesque trees, with a great trunk enlarged at the base, and strongly buttressed, fluted with low broad ridges, and covered with cinnamon brown bark (purple-tinted in the shadow) which follows the contour of the lobed trunk, and is deeply, longitudinally furrowed, and separated into fibrous scales on the ridges. This tapering shaft is naked for 100 or more feet, when great branches, eccentric in development, join in constructing the narrow, but massive domes which stand out above the other tall trees of the Sierras, and break into delicate but dense spray of much divided pendulous branchlets, blue-green when young but developing a bronzy tint when mature.

The big trees, while standing, have served as shelter for men and cattle, and are a constant attraction for tourists, the largest being known by name. One, the Wawona, in the Mariposa grove, has a portal cut through its base, which allows the passage of vehicles. But there is constant danger of their extinction. Only one comparatively unimportant and uninteresting group, the Mariposa grove, is efficiently protected. The others are owned by private interests and often by lumbermen, who cut down the magnificent trees for the sake of their light soft wood, bright red in the heart, and durable when in contact with soil, and which is dynamited apart, with enormous waste, and made principally into fencing and shingling. The big-tree has not the tremendous reproductive powers of the red-woods, the seeds have very low vitality, and in some groves almost no seedlings are found; moreover, the flocks of sheep pastured on the mountains, destroy the saplings, and the dreaded forest fires not only decimate the patriarchs but devour the young growth.

Sequoia League, a national organization devoted to the improvement of the condition of the Indians in the United States; it consists of local councils federated under the national league. In 1902 it was instrumental in obtaining a good reservation for the Warner Ranch Indians who had been dispossessed of their former home.

Sequoyah, se-kwō'yā, or **George Gist**, or **Guess**, Cherokee Indian inventor: b. about 1770; d. near San Bernardino, Northern Mexico, 1842. He exercised his ingenuity in numerous ways,—as silversmith, blacksmith, artist. In 1821 he completed the Cherokee alphabet, for which he received in 1823 a silver medal from the Cherokee general council. This alphabet was perfectly adapted to the peculiarities of the Cherokee tongue, which it expressed as the English alphabet never could. He borrowed many sym-

bols from an English speller. His alphabet was quickly adopted, was very successful, and was employed by the missionaries and, in part, in printing a newspaper, 'The Phoenix.'

Seraglio, sê-rāl'yō, Constantinople, Turkey, the former imperial palace of the Osmanli sultans, occupying the extreme eastern part of the city proper, at the entrance of the Bosphorus. It stands on the site of ancient Byzantium and is of great historic interest. The existing buildings date from the time of Mahmoud II., and chiefly occupy the summit of a hill, which is surrounded by fine gardens, the whole being enclosed by ruinous walls, partly of mediæval origin. The entrance is on the west, near the church of Saint Sophia, by the Imperial Gate (*Babi Humayum*, the "Sublime Porte"), which leads into a court lined by the mint, the old church of Saint Irene (now an armory, with many interesting objects), a museum of antiquities (also of some interest), etc. Another gate, the *Orta Kapousi*, leads from this court into an inner one, which is surrounded by arcades and the former kitchens of the sultan, his wives, and officials. The main part of the seraglio is then reached through the *Babi Saadet*, or Gate of Felicity, formerly guarded by eunuchs. Here is the Hall of the Divan, where ambassadors were formerly received, councils held, and justice administered; the treasury, with beautiful and valuable collections; and the harem, where the sultan's wives were housed. There are also kiosks and other buildings within the enclosure. Since the time of Mahmoud II. this palace has not been regularly occupied by the sultans, and it has therefore lost much of its former magnificence and interest. The word seraglio has come to denote a harem or place for the seclusion of concubines.

Seraing, sê-rān, Belgium, a town in the province of Liège, three miles southwest of the city of that name, on the Meuse River. The castle, formerly the residence of the Prince-Bishops of the Church, was converted into one of the largest iron manufactories on the continent. These extensive works cover a tract of 270 acres, and employ 10,000 men. The annual output is worth about \$9,000,000. All kinds of machinery are manufactured. Connected with the establishment are hospitals, orphan homes, savings banks, schools, etc. Other industries are the glass-works (very extensive) and coal-pits. Ship-building is also carried on. Pop. about 42,000.

Serajevo, sâ-rā'yě-vō. See BOSNA-SERAI.

Serajganj, sê-rāj-gūnj', India. See SIRAJGANJ.

Serampore, sêr-ām-pōr', or **Srirampur**, India, in Bengal, a town on the Hugli River, 12 miles north of Calcutta, and opposite Barrackpur. It has a school, church, college and library, connected with the Baptist Mission. The principal industry is the manufacture of paper and mats. The town, under the name of Frederiksnager, formerly belonged to Denmark, but was purchased in 1845 by the English East India Company. The town is attractive, and a summer resort for citizens of Calcutta. Pop. about 50,000.

Serapeum, the designation of Egyptian temples dedicated to the god Serapis. The

SERAPHIM — SERENADE

Serapeum at Memphis was the most famous. It was the cemetery of the Apis, and close to the Apeum, where the bull dwelt while in life. Within its precincts also were the dwellings of the priests, and a hospital for the sick, who flocked here to be cured by the dreams vouchsafed them by the god. The approach to the temple from the city was through an avenue of sphinxes. The ruins of the edifice, as well as the dromos of sphinxes, which had already become partially buried in the sand in the days of Strabo, were discovered by M. Mariette in 1850. After excavating a length of 7,000 feet, and uncovering 141 sphinxes, he discovered at the end of the avenue a semicircle adorned with statues of the sages, poets, and philosophers of ancient Greece, and this is supposed to have formed part of the library of the Serapeum. Near this a transverse avenue led on the right to a temple of Apis, erected by Nectanebos, and on the left to the Serapeum itself. Further excavations disclosed the subterranean tombs of the mummies of the Apis. This great cemetery divided itself into two parts, the one, a vaulted gallery, containing 20 sepulchral chambers, of dates ranging from Rameses II. to Psammetichus I.; and the other, a souterrain, divided into a number of galleries, begun in the 52d year of Psammetichus I., and continued till the beginning of the Roman Empire. The bull mummies of this division were deposited in gigantic monolith sarcophagi of Syenitic granite, sometimes as high as 12 feet, with a length of 15 feet, and weighing upward of 60 tons. The dead bull was treated as a deceased human being, and the sarcophagi were accompanied by sepulchral vases and by the usual sepulchral figures offered to the dead. Votive tablets were placed over the lintels of the doors of the chambers, and as one of these always contained the date of the birth or discovery, the enthronement, and death or burial of the particular Apis, they have become of great importance in determining the chronology of the 19th and subsequent dynasties. They end with Ptolemy Euergetes II. (177 B.C.). The discovery of 146 papyri (now in various museums), dating from the 18th to the 24th year of Ptolemy Philometor, shows that the temple was under the direction of prefects, delegates, vicars, sub-administrators, and store-keepers. Two priestesses also served Æsculapius and Serapis, and certain male devotees lived in celibacy and seclusion within the precincts of the temple, which they never left. A large number of bronze figures and various other antiquities were also discovered among the ruins. The tablets found numbered 1,200, and altogether about 7,000 objects were discovered, nearly half of them referring to the worship of the Apis. See EGYPT.

Seraphim, a plural Hebrew noun which occurs only in one passage of the Bible, Isaiah vi. 2-6, where it denotes certain heavenly creatures of human form but having each six wings, with one pair of which they covered the face, with another pair the feet, and with the third pair did fly: their station was above the throne of the Most High, and one cried to another, Holy, holy, holy is the Lord of hosts. The prophet was in terror, conscious of his unworthiness and that he was "a man of unclean lips": thereupon one of the Seraphim, taking from

the altar a live coal in his hand, with it touched Isaiah's lips, purifying them and purging his sin. The Seraphim are in the later Jewish theology and in Christian angelology classed as the highest of the orders of angels, holding the first place in the first triad of the angelic hierarchy—Seraphim, Cherubim, and Thrones. The word Seraphim, if it is of Hebrew etymology, means "burning ones": it is of the plural number, and the singular form is Seraph.

Seraphim, Order of. See ORDERS, ROYAL.

Sera'pion, physician of Alexandria, of the sect of the Empirici, flourished about the 3d century. He occupied himself almost exclusively with inquiries into the nature of drugs, and was a keen opponent of Hippocrates.

Serapis, sê-râ'pîs, or **Sarapis**, an Egyptian divinity whose worship was introduced into Egypt in the reign of Ptolemy I. It is related by Plutarch and Tacitus that Ptolemy having seen in a dream the image of a god, which he was ordered to remove from the place in which it stood, sent to Sinope, on the suggestion of a traveler named Sosibius, and brought thence a colossal statue, which he set up in Alexandria. It was declared to represent the god Serapis, affirmed by Manetho to be Pluto or the Jupiter of Sinope. A magnificent temple was built at Alexandria for the reception of the statue of Serapis, and this temple—the Serapeum—was the last hold of the pagans in that city after the introduction of Christianity. Another temple of this god at Memphis, beside the Apis cemetery, was discovered by Mariette in 1850. (See SERAPEUM.) The Egyptians themselves never acknowledged him in their pantheon, but he was the principal deity in the Greek and Roman towns, and was considered to be either Osiris, Æsculapius, Jupiter or Pluto. Forty-two temples are said to have been erected to him in Egypt under the Ptolemies and Romans; his worship extended also to Asia Minor, and in 46 A.D. it was introduced to Rome by Antoninus Pius. The image of Serapis perished with his temple at Alexandria, which was destroyed in 390 by the order of Theodosius.

Seraskier, sêr-âs-kêr', the name given to the commanders-in-chief of the Turkish armies, and particularly to the minister of war. As applied in the latter sense the seraskier has very extensive powers, and is second only to the grand-vizier.

Serenade, properly, music performed in a clear night; hence a musical entertainment provided by a lover under the window of his mistress. It consists generally of instrumental music, but vocal is sometimes added. The practice existed even among the Greeks and Romans. Such music is sometimes performed merely as a mark of esteem and good-will toward distinguished persons, and then is not unfrequently accompanied by long processions with torches. Hence the different character of serenades. A single singer may accompany his song with the guitar, mandolin, lute, etc.; or wind-instruments may be used, as flutes, horns, clarinets, hautboys; or, as is the fashion in some of the largest cities in northern Germany, many singers may join. Serenades are also sometimes used as concert-pieces, and then, of course, experience some change of character.

SERFS — SERI INDIANS

Serfs, a term applied to a class of laborers existing under the feudal system in Europe, and whose condition, though not exactly that of slaves, was little removed from it. Under this system, from the vassals of the king downward, the whole community was subject to certain degrees of servitude, and it was only on condition of specific services to be rendered to his superior that any individual held his fief. In the case of the lower classes this servitude amounted to an almost complete surrender of their personal liberty. There were two classes of laborers, the villeins and the serfs proper. The former occupied a middle position between the serfs and the freemen. Hallam remarks, in reference to these two classes, that in England, at least from the reign of Henry II., one only, and that the inferior, existed; incapable of property and destitute of redress except against the most outrageous injuries. A serf could not be sold, but could be transferred along with the property to which he was attached. The revival of the custom of manumission counteracted the rapid increase of serfs. A serf could also obtain his freedom by purchase, or by residing for a year and a day in a borough, or by military service. By these various means the serf population gradually decreased. In most parts of the Continent they had disappeared by the 15th century. The extinction of serfdom in England and Scotland was very gradual. As late as 1574 Elizabeth issued a commission of inquiry into the lands and goods of her bondsmen and bondswomen in specified counties in order to compound for their manumission; and even in the 18th century a species of serfdom existed among Scottish miners. Serfdom in Russia was abolished by a manifesto of Alexander II. on 17 March 1861.

Serge, a kind of twilled worsted cloth, used for ladies' dresses, gentlemen's summer suits, etc. Navy serge is a thick durable make of this cloth.

Sergeant, sār'jant (Emily Frances), Adeline, English novelist; b. Ashbourne, Derbyshire, 4 July 1851; d. Bournemouth; Dec. 1904. She was educated at Queen's College, London, and until 1884 engaged in teaching. She was on the staff of the Dundee 'Advertiser' for several years and afterward lived principally in London and in Bournemouth. Her earlier work was for juvenile readers, but later she devoted her time chiefly to novel writing. Her publications include: 'No Saint' (1883); 'Beyond Recall' (1883); 'Jacobe's Wife' (1887); 'The Story of a Penitent Sinner' (1892); 'The Idol-maker' (1897); 'A Valuable Life' (1898); 'A Soul Apart' (1902); 'Anthea's Way' (1903); etc. Her fictions are fluently written and eminently readable.

Sergeant, army, an inferior or non-commissioned officer in a company of infantry appointed to see discipline observed, to teach the soldiers the exercise of their arms, and to order, straighten, and form ranks, files, etc. He also commands small bodies of men, as escorts and the like. He ranks next above the corporal, and is usually chosen from the steadiest of the corporals. There are four sergeants in a company, and of these the senior is called color-sergeant. Staff-sergeants are higher than these, and the highest sergeant of all is the sergeant-major.

Sergi, sēr'jē, Giuseppe, Italian psychologist and anthropologist; b. Messina, Sicily, 22 March 1841. He was educated at Messina, was appointed professor of philosophy in the lyceums at Milan and at Messina, and in 1880 accepted the chair of philosophy at the University of Bologna. In 1884 he became professor and director of the Institute of Anthropology at Rome, a position he still occupies. Several of his works have been translated into English and his publications include: 'Elementi di Psicologia' (1879); 'Psychologie physiologique' (1887); 'Principi di psicologia,' Vol. I, 'Dolore e Piacere' (1894); 'La decadenza della nazioni latini' (1900); 'La psiche nei fenomeni della vita' (1901); etc.

Sergipe, sēr-zhē'pē, or **Sergipe-del-Rey**, Brazil, a state on the Atlantic coast; area, 15,090 square miles. The coast is flat and sandy; the interior consists of wooded hills. Streams in the populated eastern portion are numerous, but on the west are few. The chief river is the São Francisco; besides the Vasa-Barris or Irpiranza. The flora on the slopes of the Serra de Itabaiana is rich in valuable cabinet and dye-woods; iron-ore and crystal quartz occur. Although the soil is not very productive, sugarcane, cacao, cotton, tobacco, corn, rice and flax are grown. On the Campos de Criação de Gados stock-raising is profitable. The industrial establishments include sugar refineries, distilleries, flour-mills and tanneries; shipbuilding on a small scale is carried on. Sugar and cotton are the principal exports. Capital, Aracajon. Pop. about 325,000.

Sergius, sēr'jī-ūs, the name of four popes, as follows:

Sergius I.: b. Syria about 630; d. Rome 701. He succeeded Conon in 687. He opposed several provisions of the Quinisext Council of Constantinople in 692 and in consequence Justinian II. sent to arrest him. Sergius, however, was protected by the exarch of Ravenna. He died in Rome after a pontificate of nearly 14 years.

Sergius II.: b. Rome; d. 847. He succeeded Gregory IV. in 844, and during his pontificate the Saracens from Africa ascended the Tiber, and plundered the environs of Rome.

Sergius III.: d. 911. He was raised to the papal chair in 904, after the anti-pope Christopher had been expelled. On the strength of Luitprand's testimony, his character has been deeply calumniated. But contemporary chroniclers speak of him in the highest terms as a pious and enlightened pope. He restored the Lateran Church, and filled the Holy See nearly seven years.

Sergius IV.: d. 1012. He succeeded John XIX., in 1009, and during his pontificate, and as a result of his exhortations, the Italian princes united to drive out the Saracens from the country. It was in his time also that the Normans began to enter Italy.

Seri (sā-rē') Indians (Opata, 'spry'), an exceeding primitive tribe of North American Indians, speaking a distinct language and living on Tibarón island, in the Gulf of California, and the adjacent mainland of Sonora, Mexico. Although known since 1540, when some of Coronado's men visited them, almost nothing was

known of their character, save that they were warlike and extremely conservative, until Dr. W. J. McGee led a small expedition among them, in the interests of science in 1894 and again in 1895. The Seris are unusually tall and well-built; they wear little clothing and subsist chiefly on turtles, water-fowl, fish and other food of the sea, eked out with the vegetal and animal products of the mainland desert. Their houses are flimsy bowers of cactus and shrubbery, sometimes rudely shingled with turtle shells and sponges. Bows and arrows are habitually used as weapons, harpoons of cane are employed for taking turtles, and unworked boulders or cobbles form a ready means for serving meat, crushing bones, mulling seeds, etc. They make graceful balsas of canes lashed together for use in navigating the strait between their island and the mainland, manufacture a very light pottery and some basketry. Shells are used for cups and to some extent for implements. The modern Seris are loosely organized in a number of maternal groups or clans, which are notable for the prominence given to mother-right in marriage and for some other customs. Polygamy prevails. These savages manifest an implacable hatred toward aliens, whether Caucasian or Indian, and the shedding of alien blood is regarded as their highest virtue. Two centuries ago the population of the tribe was estimated at several thousands, but it has been reduced by almost constant warfare, so that now it is barely 350. Consult McGee, 'The Seri Indians'; 17th Report of the Bureau of American Ethnology, Washington, D. C.

Sericulture. See SILK AND SILK INDUSTRY.

Series. A series is a succession of numbers or terms, usually proceeding according to some definite law. The law of the series may either define how a given term is derived from those that precede it, or it may define a term as a function of the number denoting the position which it occupies in the series. Thus, the series 1, 2, 3, 5, 8, 13, ... is such that each term after the first two is obtained by adding together the two terms immediately preceding it, and the law of the series might be expressed by the formula $u_{n+1} = u_{n-1} + u_n$, in which u_{n-1} , u_n , u_{n+1} are any three consecutive terms. On the other hand, the series 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, ... may be defined by the law that the n th term of the

series is $\frac{1}{2^{n-1}}$. Each term is then a function of

the number n which determines its position in the series. One and the same series may frequently be defined in both ways. Thus, the series 1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, ... is such that each term may be obtained from the preceding one by multiplying it by $\frac{1}{2}$. It may

also be defined by the formula $\frac{1}{2^{n-1}}$ as the expression for the n th term. A series is not uniquely determined when a number of its terms are given. In fact, an infinity of series may be found which include as terms any finite number of arbitrarily assigned numbers. In such a case the simplest law that can be found is naturally to be taken as the law of the series. Important use is made of this principle in the physical sciences. Series of numbers frequently arise in connection with experimental observations, which evidently proceed

according to some definite law, and it is often of great interest to determine the nature of the law. Such series occur, for example, in the theory of spectrum analysis. Balmer's formula

$$c \frac{n^2}{n^2 - 4}$$

determines, for different integer values of n , the wave-lengths of a long series of lines in the hydrogen spectrum. A variety of formulas have been obtained for other spectra. A very instructive account of the methods used in determining such series is given in Kayser's 'Handbuch der Spectroscopie,' vol. 2, pp. 503-573.

A series is said to be *finite* or *infinite* according as the number of its terms is limited or unlimited.

FINITE SERIES.

The law of the series being given, the most important problems relating to a finite series are the determination of the term occupying a given position and finding the sum of the series. The following cases are those of chief interest.

Arithmetic Series.—This series is $a, a+d, a+2d, \dots, l$, so that the difference between any two consecutive terms is constant and equal to d . The n th term l is evidently obtained by adding d $n-1$ times to a and hence $l = a + (n-1)d$. If S denote the sum of the series, then $S = a + (a+d) + (a+2d) + \dots + l$. By writing the terms in reverse order, the sum may also be expressed in the form

$$S = l + (l-d) + (l-2d) + \dots + a.$$

The addition of these two equations gives $2S = (a+l) + (a+l) + \dots$ to n terms, whence $S = \frac{1}{2}n(a+l) = \frac{1}{2}nd[a + (n-1)d]$. In particular the sum of the first n integers 1, 2, 3, ..., n is $\frac{1}{2}n(n+1)$, and the sum of the odd integers 1, 3, 5, ..., $2n-1$ is n^2 .

Higher Arithmetic Series.—The general expression $a + (n-1)d$ for the n th term of an arithmetic series is an integral function of the first degree in n . A more general series may be formed in which the expression for the n th term is an integral function of degree s in the n . Such a series is called a *higher arithmetic series* of order s . Let a_1, a_2, a_3, \dots represent the series. A new series b_1, b_2, b_3, \dots is formed from this by taking the differences of consecutive terms, so that $b_1 = a_2 - a_1, b_2 = a_3 - a_2$, etc. This is called the series of first differences. Let a series c_1, c_2, \dots be formed from b_1, b_2, \dots in like manner. These are the second differences. Let d_1, d_2, \dots be the first terms in the series of third, fourth, ... differences respectively. Since a_n is a polynomial of degree s in n and a_{n+1} is the same polynomial in $(n+1)$, it follows that b_n , which equals $a_{n+1} - a_n$, is of degree $s-1$ in n ; and, finally, that the n th term of the series of $(s-1)$ th differences is of degree one in n ; that is, the last series of differences is a simple arithmetic series. The series of s th powers of the natural numbers 1, 2^s, 3^s, ..., n^s is the simplest example of a higher arithmetic series of order s .

The n th term of the series a_1, a_2, a_3, \dots can readily be expressed in terms of n, b_1, c_1, \dots namely,

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$$a_n = a_1 + (n-1)b_1 + \frac{(n-1)(n-2)}{1 \cdot 2} c_1 + \frac{(n-1)(n-2)(n-3)}{1 \cdot 2 \cdot 3} d_1 + \dots,$$

the last term of the formula being of degree s in n . With fractional values of n this formula is much used for the purpose of interpolating between the terms of a given series numbers which shall follow the same general law of variation. For example, suppose it be required to find $\log 91.43$, given $\log 91 = 1.9590414$, $\log 92 = 1.9637878$, $\log 93 = 1.9684829$, $\log 94 = 1.9731279$. The required number is intermediate between $\log 91$ and $\log 92$, which are the first and second terms of the series having $\log(90+n)$ for its n th term. As the number 91.43 corresponds to $n = 1.43$, the value of $\log 91.43$ may be calculated approximately by assuming that for a small number of terms the series of logarithms coincides very nearly with a higher arithmetic series of order s , the closeness of the approximation increasing with higher values of s . The first terms of the successive series of differences are $b_1 = .0047464$, $c_1 = -.0000513$, $d_1 = .0000012$, etc. First try $s = 1$, that is, use only two terms of the formula for a_n . This gives $\log 91.43 = 1.9590414 + .43(.0047464) = 1.9610824$, which is correct to only five decimals. With $s = 2$, $\log 91.43 = 1.9610886$, which is less than the true value by one unit in the seventh place of decimals. With $s = 3$, that is, by using four terms of the formula for a_n , the value is obtained correctly to seven decimal places.

Geometric Series.—This is composed of the terms a, ax, ax^2, ax^3, \dots . Each term is formed from the one preceding by multiplying it by x , so that the n th term is ax^{n-1} . If S denote the sum of n terms of the series, then

$$S = a + ax + ax^2 + \dots + ax^{n-1}.$$

The multiplication of this expression by x gives $xS = ax + ax^2 + ax^3 + \dots + ax^n$, whence, by subtracting from the preceding, $(1-x)S = a - ax^n$, and accordingly $S = \frac{a(1-x^n)}{1-x}$.

Recurring Series.—A more general form of series is the *arithmetico-geometric series*, in which the n th term is of the form $(a+bn)x^{n-1}$. It reduces to the arithmetic series when $x=1$, and to the geometric series when $b=0$. This in turn is a special case of a *recurring series*, which is defined as follows: Let $a_1, a_2x, a_3x^2, \dots, a_nx^{n-1}$ be the terms of such a series. If $r+1$ successive coefficients a_i are connected by a homogeneous linear relation of the form $a_n + p_1a_{n-1} + p_2a_{n-2} + \dots + p_ra_{n-r} = 0$, in which p_1, p_2, \dots, p_r are given numbers and $n > r$, the series is called a *recurring series of order r* . The sum of n terms of a recurring series can always be found. The result is a rational fraction in x . The method of summation may be illustrated by the series of order 2. The defining relation is

$$a_n + p_1a_{n-1} + p_2a_{n-2} = 0.$$

Let $S = a_1 + a_2x + a_3x^2 + \dots + a_nx^{n-1}$. Multiply by $1 + p_1x + p_2x^2$. This gives

$$(1 + p_1x + p_2x^2)S = a_1 + (a_2 + p_1a_1)x + (a_3 + p_1a_2 + p_2a_1)x^2 + \dots + (a_n + p_1a_{n-1} + p_2a_{n-2})x^{n-1} + (a_np_1 + a_{n-1}p_2)x^n + a_{n-1}p_2x^{n+1}.$$

Since $a_s + p_1a_{s-1} + p_2a_{s-2} = 0$, the above expression reduces to

$$a_1 + (a_2 + p_1a_1)x + (a_np_1 + a_{n-1}p_2)x^n + a_{n-1}p_2x^{n+1},$$

and hence

$$S = \frac{a_1 + (a_2 + p_1a_1)x + (a_np_1 + a_{n-1}p_2)x^n + a_{n-1}p_2x^{n+1}}{1 + p_1x + p_2x^2}.$$

The Harmonic Series is $\frac{1}{a}, \frac{1}{a+d}, \frac{1}{a+2d}, \dots$, its terms being the reciprocals of the terms of an arithmetic series. The n th term is accordingly $\frac{1}{a+(n-1)d}$. The series is so named because the harmonic tones of a fundamental musical note are produced by the divisions of a vibrating string (or column of air in a tube) into lengths, which form a harmonic series. No formula exists for the sum of n terms of a harmonic series.

INFINITE SERIES.

Convergent Series.—Let $u_1, u_2, \dots, u_n, \dots$ be the terms of an infinite series, and let S_n denote the sum of the first n terms. If S_n approaches a definite, finite limit as n increases to infinity, the given series is said to be *convergent*. If, on the other hand, S_n increases without limit, the series is *divergent*. If S_n does not approach any limit, the series is called *indeterminate*, as in the case of the series $1 - 1 + 1 - 1 + \dots$, for which S_n takes the values 1 and 0 alternately as n increases. To illustrate these definitions, consider the infinite geometric series $a + ax + ax^2 + \dots + ax^{n-1} + \dots$. By the formula given above for the sum of a

geometric series, $S_n = \frac{a(1-x^n)}{1-x}$. If x is numerically less than unity, x^n diminishes to zero as n increases to infinity, and hence S_n approaches $\frac{a}{1-x}$ as a limit. This expression is called the

generating function of the series. The series and its generating function are equal for all values of x for which the series is convergent, that is, for values of x numerically less than 1. But if x is numerically greater than 1, S_n approaches infinity as n increases without limit. The series is then divergent and is no longer equal to the generating function. Similarly, with a recurring series, if its terms approach zero as a limit with increasing n , the terms $a_nx^n, a_{n-1}x^{n-1}, a_{n-2}x^{n-2}$ in the above formula for the sum of n terms of a series of order 2 approach zero and hence S_n

has for limit $S = \frac{a_1 + (a_2 + p_1a_1)x}{1 + p_1x + p_2x^2}$. A like result holds for a recurring series of any order.

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A series can represent its generating function only for such values of the variable (or variables) on which it depends as will make it convergent, and hence the question of the convergence of a series is of paramount importance. Suppose at first that the terms of the series are positive. Then, if the ratio $u_{n+1}:u_n$ becomes and remains less than a proper fraction k as n increases without limit, the series $u_1+u_2+\dots+u_n+\dots$ is convergent. For in that case $u_{n+1}<ku_n$, $u_{n+2}<ku_{n+1}<k^2u_n$, $u_{n+3}<ku_{n+2}<k^3u_n$, and so on. Hence $u_n+u_{n+1}+u_{n+2}+u_{n+3}+\dots<u_n(1+k+k^2+k^3+\dots)$. But as k is a positive number less than 1, the infinite geometric series $1+k+k^2+\dots$ is convergent and equals $\frac{1}{1-k}$. Accordingly $u_n+u_{n+1}+\dots$, which is

less than the finite quantity $\frac{u_n}{1-k}$, is a convergent series. If to this portion of the series the finite sum $u_1+u_2+\dots+u_{n-1}$ be added, the result is finite and the given series is therefore convergent. While the condition just given is sufficient to insure the convergence of a series it is not necessary. Thus, if a and b are such that $0<a<b<1$, then the series $a+b^2+a^3+b^4+a^5+\dots$ is convergent, since it consists of the sum of the two convergent geometric series $a+a^3+\dots$ and $b^2+b^4+\dots$. But $u_{n+1}:u_n$ alternates between large and small values as n increases and does not therefore remain less than a proper fraction.

If some of the terms of a given series are negative, the series is convergent provided that the series obtained by changing the signs of all the negative terms is convergent. For example, the series $1-k+k^2-k^3+k^4-\dots$, in which k is a positive number, is less than the series $1+k+k^2+k^3+\dots$ and is therefore convergent if $k<1$. It follows from the preceding considerations that any series is convergent if the ratio $u_{n+1}:u_n$ has a limit numerically less than 1 as n increases to infinity. Thus, for the logarithmic series $\log(1+x)=x-\frac{1}{2}x^2+\frac{1}{3}x^3-\dots\pm\frac{x^n}{n}\mp\frac{x^{n+1}}{n+1}\dots$ the numerical value of

$u_{n+1}:u_n$ is the same as that of $\frac{x^{n+1}}{n+1}:\frac{x^n}{n}=\frac{n}{n+1}x$. The limit as n increases to infinity is x . The series will accordingly be convergent if x is numerically less than 1. For the exponential series

$$e^x=1+x+\frac{x^2}{2!}+\frac{x^3}{3!}+\dots+\frac{x^n}{n!}+\dots,$$

$$u_{n+1}:u_n=\frac{x^n}{n!}:\frac{x^{n-1}}{(n-1)!}=\frac{x}{n}.$$

For any finite value of x this ratio becomes and remains a proper fraction as soon as n exceeds x in absolute value. Hence the series is convergent for all finite values of x .

A series of positive and negative terms is said to be *absolutely* convergent if the series obtained by making all of the terms positive is convergent. When the second series is divergent it sometimes happens that the first series is convergent, in which case it is called *conditionally* convergent, because the value of the sum is conditioned on the arrangement of the terms. For example, the logarithmic series is absolutely

convergent for all values of x numerically less than 1. If $x=1$, it becomes $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\dots$, which is convergent and equals $\log 2$. But the series $1+\frac{1}{2}+\frac{1}{3}+\dots$ obtained by making all the terms positive is divergent. A conditionally convergent series has the peculiar property that by changing the sequence of the terms the sum of n terms may be made to approach any desired limit as n increases to infinity, as may be exemplified by the preceding series. For, let c be any number. Select in order as many of the positive terms of $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\dots$ as will be sufficient to make a sum greater than c . Then select just enough negative terms so that when added to these the sum shall become less than c . Then add more positive terms until the sum becomes greater than c , and so continue. This process is possible, since the positive or the negative terms alone form a diverging series. With such an arrangement of terms the sum may be made to approach as near to c as desired.

Uses of Series.—Series are of the utmost value as affording a means for the expression of any given function. In particular, functions which are defined as solutions of differential equations are most frequently not expressible in any other form. In the theory of functions as developed by Weierstrass the convergent power-series is made the fundamental instrument of investigation, and from the properties of its defining series the nature of a function is determined. [See THEORY OF FUNCTIONS.] The expression of a function in the form of a series is of especial importance when it is desired to calculate its numerical value. It is by this means that various numerical tables, such as the logarithmic and trigonometric, are calculated.

$$\text{Taylor's series } f(x)=f(a)+f'(a)(x-a)+\frac{1}{2!}f''(a)$$

$(x-a)^2+\dots+\frac{1}{n!}f^{(n)}(a)(x-a)^n+\dots$ is the formula most generally useful for the purpose of expanding any given function $f(x)$ in ascending powers of $x-a$, a being a given constant so chosen that the function and its derivatives $f'(x)$, $f''(x)$, \dots , $f^{(n)}(x)$, \dots are finite and continuous for values of x sufficiently near to a . Another form for Taylor's series, and the one to which the name is more frequently applied, is obtained by writing h in the place of $x-a$ so that $x=a+h$. The above equation then takes the form

$$f(a+h)=f(a)+f'(a)h$$

$$+\frac{1}{2!}f''(a)h^2+\dots+\frac{1}{n!}f^{(n)}(a)h^n+\dots$$

This series is convergent if h is not too large. *Maclaurin's series* for the expansion of a function of x in ascending powers of x is obtained as a special case of the first form of Taylor's series by putting $a=0$. The formula is of course inapplicable if the given function or any of its derivatives are not finite when $x=0$.

For the purposes of numerical calculation it is essential to know how close an approximation to the true value of the function may be obtained by using a given number of terms in Taylor's series and discarding the rest. If S_n denote the sum of the first n terms of the series and R_n the remainder of the series, then

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$f(x) = S_n + R_n$ and the amount of error introduced by using S_n as the approximate value of $f(x)$ is equal to the remainder R_n . An expression for the remainder in Taylor's series (second equation) was obtained by Lagrange in the form

$R_n = \frac{1}{n!} f^{(n)}(a + \theta h) h^n$, in which θ denotes a certain number between 0 and 1. To illustrate, the formula for $\sin(a + h)$ expressed in terms of Lagrange's remainder is

$$\sin(a + h) = \sin a + \cos a \cdot h - \frac{1}{2} \sin a \cdot h^2$$

$$- \frac{1}{3!} \cos a \cdot h^3 + \dots + \frac{1}{n!} \sin\left(a + n\frac{\pi}{2} + \theta h\right) h^n.$$

Since $\sin x$ does not exceed 1 in numerical value the error in discarding the remainder of the series after n terms is not numerically greater than $\frac{h^n}{n!}$. If, for example, knowing $\sin 45^\circ =$

$\cos 45^\circ = \frac{1}{\sqrt{2}}$, it is desired to calculate $\sin x$ for succeeding angles at intervals of $1''$, the value for h is taken to be .0000048481, which is the radian measure for $1''$ in degree measure. Two terms of the preceding formula give the value of $\sin 45^\circ 1''$ correct to ten decimals. For the

remainder is $R_n = \frac{-\sin\left(\frac{\pi}{4} + \theta h\right)}{2} \cdot h^2$, the first factor of which differs only slightly from $-\frac{1}{2\sqrt{2}}$, while h^2 has no significant figure before the eleventh decimal place.

The cases in which Lagrange's formula is practicable for determining the limit of error are comparatively few in number. A convenient limit of error may frequently be found by comparing the given series with a simpler one of less rapid convergence, the limit of error for which can be determined. In particular, a series $u_1 - u_2 + u_3 - u_4 + \dots$ of alternately positive and negative terms which are numerically decreasing towards zero as a limit is convergent, and the error in taking only n terms is less than the next succeeding term u_{n+1} , but greater than $u_{n+1} - u_{n+2}$. For the series may be written $(u_1 - u_2) + (u_3 - u_4) + \dots$, which is a sum of positive terms and therefore increases, with the number of terms, toward a finite limit, or becomes indefinitely large. But the series may also be written $u_1 - (u_2 - u_3) - (u_4 - u_5) - \dots$, in which all the terms after the first are negative and hence the sum is less than u_1 . The numerical value of R_n is $u_{n+1} - u_{n+2} + u_{n+3} - \dots$, which, by a repetition of the preceding argument, is greater than $u_{n+1} - u_{n+2}$ and less than u_{n+1} . Thus, for the logarithmic series mentioned above, the error in stopping with the n th term is less than $\frac{x^{n+1}}{n+1}$ (if x is positive). For $x = \frac{1}{10}$ the value of $\log(1+x)$ is given by S_n correct to at least $(n+1)$ decimal places. For values of x near 1 the series converges very slowly. A more rapidly converging series can be obtained by changing x into $-x$, which gives

$$\log(1-x) = -x - \frac{1}{2}x^2 - \frac{1}{3}x^3 - \dots,$$

whence, by subtracting the series for $\log(-+x)$

$$\log \frac{1+x}{1-x} = 2\left(x + \frac{1}{3}x^3 + \frac{1}{5}x^5 + \dots\right).$$

In this x is replaced by $\frac{1}{2z+1}$, from which follow:

$$\log \frac{z+1}{z} = \log(z+1) - \log z$$

$$= 2\left[\frac{1}{2z+1} + \frac{1}{3(2z+1)^3} + \dots\right].$$

This series is convergent for all positive values of z . The remainder after n terms is

$$2\left[\frac{1}{(2n+1)(2z+1)^{2n+1}} + \frac{1}{(2n+3)(2z+1)^{2n+3}} + \dots\right]$$

which is evidently less than the geometric series

$$\frac{2}{(2n+1)(2z+1)^{2n+1}} \left[1 + \frac{1}{(2z+1)^2} + \frac{1}{(2z+1)^4} + \dots\right]$$

the sum of which is $\frac{1}{2(2n+1)(2z+1)^{2n+1}(z^2+z)}$. The error in neglecting R_n is accordingly less than the value of this expression.

The importance for numerical computation of having a series of sufficiently rapid convergence is illustrated by the formula for π . Gregory's series is $\frac{1}{4}\pi = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$, which converges so slowly that according to Newton it would require five billion terms and one thousand years' time to calculate the value of π to twenty decimals. On the other hand, by means of Machin's formula, which converges very rapidly, Shanks has computed the value of π to 707 decimal places.

Divergent Series.—It was supposed by the earlier mathematicians that divergent series were entirely useless. There is, however, a class of such series that have been found not only useful but necessary for the purposes of approximate computation. These have been employed for a long time by astronomers even after their divergence had been proved, their use being justified by the close agreement between calculation and observation. The series in question have the property that the terms at first decrease in numerical value until a certain minimum term is reached, after which they increase without limit. The series is converging as far as its minimum term, beyond which it is diverging. The converging portion of the series frequently affords a very good approximation to the value of the given function. The

series for the probability integral $\int_0^x e^{-t^2} dt$ is an example of this kind. By expanding e^{-t^2} in powers of t^2 and integrating term by term, this function is expressed by means of the series $x - \frac{1}{3}x^3 + \frac{1}{5 \cdot 2}x^5 - \frac{1}{7 \cdot 3!}x^7 + \dots$, which is convergent for all finite values of x . For large values

of x the convergence is too slow for practical purposes and the series

$$\frac{\sqrt{\pi}}{2} - \frac{e^{-x^2}}{2x} \left[1 - \frac{1}{2x^2} + \frac{1 \cdot 3}{2^2 \cdot x^4} - \frac{1 \cdot 3 \cdot 5}{2^3 \cdot x^6} + \dots \right]$$

is used instead. While this series is divergent beyond a certain term, the sum of the converging portion gives an approximation having an error less than the numerical value of the last term used. This approximation is so good and the convergence so rapid that for values of x as small as 3 this series is more convenient to use than the first one and gives a value correct to eight decimals, the first eleven times being convergent, while for $x=10$ the first 100 terms are convergent and give a value which is correct to at least 110 decimal places.

The theory of divergent series has recently been receiving considerable attention, chiefly from the French mathematicians. In particular, the problem of determining in how far the divergent series may validly be used as a purely formal representation of a function has been studied by Poincaré, who has developed some important and far-reaching results. An interesting account of the present state of the subject is given by Borel in his 'Leçons sur les séries divergentes' (Paris, 1901).

Series of Functions; Multiple Series.—It is often important to express a function as a series the terms of which are given functions such as trigonometric or Bessel functions. Such series are of great service in mathematical physics, especially the *Fourier series* of sines and cosines of multiple angles, which is much used for representing functions having a periodic character. This series was first employed for that purpose by Fourier (1822) in his 'Théorie analytique de chaleur.'

In a simple series u_1, u_2, \dots the general term u_n is a function of a single integer n defining its position in the series. A *double series* is one in which the general term $u_{m,n}$ is a function of two independent integers m, n . A *multiple series* is one in which the general term is a function of several integers m, n, p, \dots . Such series are of fundamental importance in the study of various classes of functions such as the elliptic functions and the multiple theta functions.

History and Literature.—Some of the properties of arithmetic and geometric series were known in very ancient times, as the oldest manuscript in existence, the Rhind papyrus, which is believed to be a copy of a work dating back three thousand or more years before Christ, gives an account of some problems which are solved by means of these series. There is considerable ground for supposing that the general formula for the sum of an arithmetic series was known at that time, although it does not occur explicitly in mathematical literature until the time of Archimedes (287–212 B.C.). The formula for the sum of a geometric series was known to the Greeks as it is given by Euclid (about 300 B.C.), while the summation of the infinite series $1 + \frac{1}{2} + (\frac{1}{2})^2 + (\frac{1}{2})^3 + \dots$ was effected by Archimedes. The general expression for the sum of an infinite geometric series was first given by Vieta (1540–1603 A.D.). A formula for the sum of the squares of the positive integers was given by Archimedes, and for their cubes by

Nikomachus (about 100 A.D.). Except for these two particular cases no knowledge of the summation of higher arithmetic series is apparent before the sixteenth century. The subject as we now know it was developed chiefly in the following century and it took its present form in the 'Ars conjectandi' of Jacob Bernoulli (1713). The name 'arithmetic series of higher order' was given by Leibnitz. Newton was the first to recognize the importance of infinite series as an instrument of mathematical investigation. His results were published in 1669 (not printed until 1704) in a work entitled 'Analysis per Aequationes Numero Terminorum Infinitas.' A systematic treatment of series was given by Euler in his 'Introductio in analysin infinitorum' (1748). The principle that an infinite series cannot be safely employed unless it is convergent was first given in this work. Gauss (1813) inaugurated the modern epoch in the theory of infinite series in his memoir, 'Disquisitiones generales circa seriem infinitam, $1 + \frac{a \cdot b}{1 \cdot c}x + \frac{a(a+1) \cdot b(b+1)}{1 \cdot 2 \cdot c \cdot (c+1)}x^2 + \dots$ ' He insisted

on rigorous tests for convergence and was the first to give definite criteria for convergence and divergence. In the 'Cours d'analyse de l'Ecole Polytechnique' (Paris, 1821), Cauchy extended the theory of power-series to the expansion of functions of a complex variable and gave the important theorem that a series is convergent if the limit of $\sqrt[n]{u_n}$ is numerically less than 1 when n increases to infinity. Further contributions, including additional criteria for convergence and a development of the principle of continuity of series, were made by Abel (1826) in his 'Recherches sur la série,

$$1 + \frac{m}{1}x + \frac{m(m-1)}{1 \cdot 2}x^2 + \dots$$

('Oeuvres complètes,' vol. I, p. 223). This celebrated memoir is a model of scientific accuracy and comprehensiveness, and exerted an important influence on the growing spirit of rigorous and critical investigation.

Among modern works on series the following may be mentioned: Chrystal's 'Algebra' (Edinburgh, 1886), chaps. xx, xxvi–xxxi; Osgood's 'Introduction to infinite series' (Harvard University Publications, 1897); Godefroy's 'Théorie élémentaire des séries' (Paris, 1903); Runge's 'Theorie und Praxis der Reihen' (Leipzig, 1904); Borel's 'Leçons sur les séries à termes positifs' (Paris, 1902); Hadamard's 'La série de Taylor' (Paris, 1901); Jordan's 'Cours d'analyse' (Paris, 1893), vol. I, chap. iii; 'Encyclopédie der Mathematischen Wissenschaften' (Leipzig, 1898–1904), vol. I, part 1, pp. 47–146.

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Serin, in ornithology, a finch, *Serinus hortulanus*, which is closely allied to the canary. The bird's mantle and back are of a dark-grayish brown, each feather being edged with a broad strip of yellow. Its head is olive-gray, and the throat and breast are of a bright gamboge-yellow, shading to white on the belly. It is four and one-half inches long. The serin-finch is noted as a lively and indefatigable singer. It is migratory, and spends the summer and oftentimes the winter in Middle Europe.

SERINGAPATAM — SEROW

Seringapatam, sēr-ing-ga-pa-tām' (properly, Sri-ranga-patanam, "city of Vishnu"), India, a celebrated town and fortress, the former capital of Mysore, 245 miles west by south from Madras, on an island formed by two branches of the Kaveri. The fort, a massive structure, stands on the western end of the island, and contains within its walls the ruins of the palace of Tippu Saib (q.v.), a mosque built by the same ruler, and an old temple. Just outside of the fort is Tippu's graceful summer palace, now in ruins. At the east end of the island, near the suburb of Ganjam, where almost all the inhabitants now reside, is the mausoleum in which Tippu and his father Hyder Ali are buried. The fort was three times besieged by the British, first in 1791, and afterward in 1792 and 1799. On the last occasion the fortress was carried by assault, Tippu being slain. The town once contained about 150,000 persons, but its population in course of time has steadily decreased until now it is only about 12,500.

Serinus, in ornithology, a genus of the sparrow family *Pringillidae* (q.v.), having a stout cone-shaped bill, broad at the base; the nostrils basal, round and hidden by stiff frontal feathers directed forward, gape straight, without bristles. The serinus is small, compact and active; the legs are short, and scutate; the feet strong; the wings which are moderately long and somewhat pointed have a minute outer primary; and the tail is deeply forked. The Serin (q.v.), *Serinus hortulanus*, the *S. canonicus*, the *S. canarius*, the canary, and *S. pusillus*, the red-fronted finch, are inhabitants of the Western Palearctic regions, but some species are to be found in the Eastern Palearctic, Oriental, and Ethiopian regions.

Seriola, in ichthyology, a genus of *Carangidae*, divided into 12 species and inhabiting temperate and tropical waters. The body is oblong, and slightly compressed, and the abdomen is rounded; the first dorsal fin is continuous, with feeble spine; villiform teeth in jaws and on the vomer and palatine jaws. The smaller species are valueless, but the larger species which range from four to five feet in length are used as food.

Seriphos, sē-rī'fōs, or **Serpho** (now SERPHOS), Greece, a mountainous island of the Cyclades group, 50 miles south of Eubœa. It contains iron, copper and lead ore—formerly exploited. The products are chiefly corn and wine. The ancient town participated in the battle of Salamis, furnishing the Athenians with several ships. Seriphos was also a place of exile for the Romans. Pop. 4,000.

Serlio, sār'lē-ō, **Sebastian**, Italian artist: b. Bologna 6 Sept. 1473; d. Fontainebleau 1554. He worked as painter and architect at Pesaro for 14 years, leaving that city (1514) for Rome and Venice, where he became Titian's associate. He published at Venice in 1537 his voluminous treatise 'Regole Generale d'Architettura.' He is supposed to have worked with Pierre Lescot on the Louvre. Primaticcio in 1541 was appointed architect at Fontainebleau with Serlio as assistant.

Serna y Hinojosa (lā-sār'nā ē ēn-ō-hō-sā) José de la, famous Spanish general: b. Jerez de la Frontera 1770; d. Cadiz 1832. He fought

in the Peninsular War against the French and served under Wellington in 1813. After working his way up from the ranks to the position of major-general, in 1816 he was placed in command of the Spanish Royalist army in Upper Peru. In this capacity he was in constant conflicts with the natives and numerous uprisings gave him the opportunity to display his military ability. He was, however, defeated by the patriots at Salta and Jujuy, and, owing to disagreements with the viceroy in regard to the conduct of the army during the campaign, resigned in 1819, but was at once made lieutenant-general and president of the council of war. Not long after this he was again appointed to the command of the army to suppress the uprising under San Martín, and on 29 Jan. 1821, upon the deposition of the viceroy Pezuela by his officers, he became viceroy. He was not able to stem the tide of San Martín's successes and on 6 July 1821 was forced to evacuate Lima, retreating to Cuzco. From here he directed his army and maintained it for over three years against the patriots without any assistance from Spain, and keeping his ground in the interior with great skill and resolution. He was finally defeated on 9 Dec. 1824 by the patriot leader, Gen. Sucre, in the battle of Ayacucho. Though outnumbered by the Royalists, the patriots won the battle and Serna with his whole army was captured. He was severely wounded during the fight, and was afterward released and sent back to Spain, where he died at the age of 52.

Serous Membrane, a delicate glistening tissue of flattened endothelial cells, supported by a fibrous and elastic layer in which are capillaries and lymphatics. The serous membranes of the human body form closed sacs. For the most part they line certain cavities of the body and are reflected over the surface of the organ or organs contained in the cavities. The portion of the membrane lining the walls of the cavity is known as the parietal portion, the other is the visceral portion. The serous membranes, six in number, are the peritonæum, lining the abdominal cavity and reflected upon the stomach, liver, intestines, etc.; the two pleuræ lining the thoracic or chest cavity, and reflected upon the lungs; the pericardium, a fibro-serous sac covering or enclosing the heart; and the tunica vaginalis, a closed sac surrounding each testicle. In the female, when the ovum passes from the ovary into the Fallopian tube, the peritonæum is not a closed sac. The serous membranes are kept moistened by a watery lymph-like fluid, a variety of serum, which, if secreted in large quantity, as in dropsy, may produce bad results. Lymphatic vessels open freely on the surface of serous membranes, hence they are sometimes spoken of as lymph-sacs and the cavities they line as lymph-cavities. A grave danger arising from injuries and inflammation of serous membranes is the absorption of septic material by the lymphatics. Dropsical effusions, hemorrhage, formation of pus, and deposits of fibrous exudations which cause adhesions and prevent mobility of viscera are the principal results of inflammation of these membranes.

Ser'ow, a shaggy goat-antelope (*Nemorrhæus bubalinus*) of the Himalayas, where it frequents, singly, or in family parties, the roughest

slopes, at an altitude between 6,000 and 12,000 feet. Its habits are similar to those of the goral, Rocky Mountain white goat (q.v.), and other members of the genus, all of which are called "serows" by some writers.

Serpa Pinto, sār'pā pēn'tō. See PINTO, ALEXANDRE ALBERTO DA ROCHA SERPA.

Serpent, (1) in astronomy, one of the 48 varieties of ancient constellations extending serpent-like through a wide expanse of sky. (2) In music, an almost obsolete bass instrument, consisting of a wooden tube, about eight feet long, increasing conically from one inch diameter at the mouth-piece to four inches at the open end, twisted into U-shaped turns, followed by a large circular convolution. This is covered with leather, and has a mouth-piece like a horn or trombone, and keys for the several notes to be produced. The serpent is a transposing instrument, being in B flat, and the part it is to take is therefore written a note higher than its real sound. Its compass is three octaves and one note.

Serpent-charming, an art largely practised in Egypt, India and other eastern lands; there are allusions to it in the Hebrew sacred books, namely, Ps. lviii. 5, the adder which will not hearken to the voice of charmers; Eccles. x. 11, and Jer. viii. 17; also in some of the Greek and Latin classics. The power of charming the most formidable serpents, as exercised by the snake-charmers, is unquestionable; nor is it true that before making an exhibition of their art the charmers always extract the poison-fangs of the creature, though that is often done. Dr. Davy, in his 'Interior of Ceylon,' expresses his belief in the reality of this singular power. "I have examined the snakes," he writes, "and have found the fangs in and uninjured. These men do possess a charm, though not a supernatural one—namely, that of confidence and courage.

They will play their tricks with any hooded snakes (*Naja tripudians*), whether just taken or long in confinement, but with no other kind of poisonous snakes." The serpent-charmers are sometimes employed to rid gardens of serpents; and they have a power beyond other men of knowing when a serpent is concealed anywhere. In practising their art for this purpose, as also in their exhibitions, they employ a kind of flute in aid of their incantations. When the serpents issue from their hiding places the performer secures them by pinning them to the ground with a forked stick.

Serpent-eagle, the secretary-bird (q.v.).

Serpent-head, or **Walking-fish**, a fish of the East Indian and African genus *Ophiocephalus*, the type of a family, allied to the climbing perch, and like it able to live a long time out of the water, and to travel by wriggling through moist grass, from one pool to another. The body is elongate, two to three feet long, and covered with medium-sized scales, those on the depressed head being platelike. About 30 species are known, inhabiting many parts of Asia, the commonest being *O. striatus*, which is sometimes found torpid in dried-up pools, and irrigation tanks. When living in muddy water they must rise to the surface from time to time to take in air, or they will smother to death. These fishes are eaten throughout the Orient.

Serpent-worship, or **Ophiolatry**, a primitive form of religion which is still found existing among uncultured races. The serpent's change of skin may well have been suggestive of resurrection and immortality; the more common supposition that the serpent was regarded by his savage worshippers as the personification of evil and of maleficence, and as a power to be appeased by gifts and worship, does not appear to be justified by the reports of travelers, though the Apophis-serpent of the Egyptian Hades, as well as the wicked Aji Dahaka of the Zoroastrians were undoubtedly worshipped purely through fear. The brazen serpent erected by Moses in the wilderness and afterward preserved till the days of Hezekiah was broken in pieces by that king (2 Kings xviii. 4), the image having been made an object of religious worship; this was apparently a recrudescence of primitive serpent-worship among the people of Judah: the brazen serpent, it is conjectured by Renan ('Hist. Peuple d'Israël' I. xi.), was a primitive idol of Jahve. We see a trace, and more than a trace, of a primitive worship of the serpent in the great serpent which guarded the citadel of Athens and which was fed every month with honey-cakes; also in the embassy from Rome on the occasion of a plague, to the temple of Æsculapius at Epidaurus, whence was brought a living serpent which was received at Rome with great ceremony. Serpent-worship is still extensively practised in India. Among no people has the mystery of serpent worship weighed more than on the aborigines of America. It has given name to rivers, examples, Kennebec and Antietam: the name for *spirit* and *snake* are one among the Dakotas, the Shawnees and the Sacs. The Ojibways dread to kill a rattlesnake, and if they find one in their path they pray it to go away and spare them and their families. In Mexico sculptured images of serpents are found as large and as carefully wrought as those of India.

Serpentine, hydrous magnesium silicate, is an abundant and widely distributed mineral. Its hardness varies more than that of any other mineral, ranging from 2 in the variety picrolite up to 6 in bowenite. Its specific gravity varies from 2.14 in some chrysotile to 2.80 in some precious serpentine. It often occurs in pseudomorphs, over a dozen of which have been described. Among these the most common are the pseudomorphs after chrysolite, enstatite, amphibole and pyroxene. Its varieties are mostly based on structure. The massive include precious serpentine, translucent and of rich, dark or pale green color; common serpentine, similar in color, but nearly opaque. The lamellar varieties include antigorite and marmolite. Williamsite, though more massive, is one of the lamellar varieties. It is apple-green and translucent, and is often cut and polished. Chrysotile is fine fibrous, the fibres being easily separable and flexible. Its lustre is silky, color pale green, yellow or brown. It often occurs in veins in massive serpentine. (See ASBESTOS.)

Serpentine rocks occur in masses often of enormous dimensions. They are formed, as indeed are all serpentines, by the alteration ("serpentinization") of other minerals, most commonly olivine (peridotite), pyroxene, or amphibole. They are often more or less mixed with

SERPENTINES — SERPENTS

limestone or magnesite, these minerals giving the mass a clouded or veined appearance. Verd antique (q.v.) or opicalcite, and many other serpentine rocks are known as serpentine marbles, and are extensively used in interior decoration. Some of them are very highly prized for their rich green, yellow and brown colors, others are beautifully mottled with red. (See Merrill, 'Stones for Building and Decoration'). Many buildings in Philadelphia and other cities are constructed of a green serpentine rock from West Chester, Pa. Among the most noteworthy regions producing serpentine are England, Ireland, Maryland, New Mexico, California, and Washington.

Serpentines. See ORDNANCE.

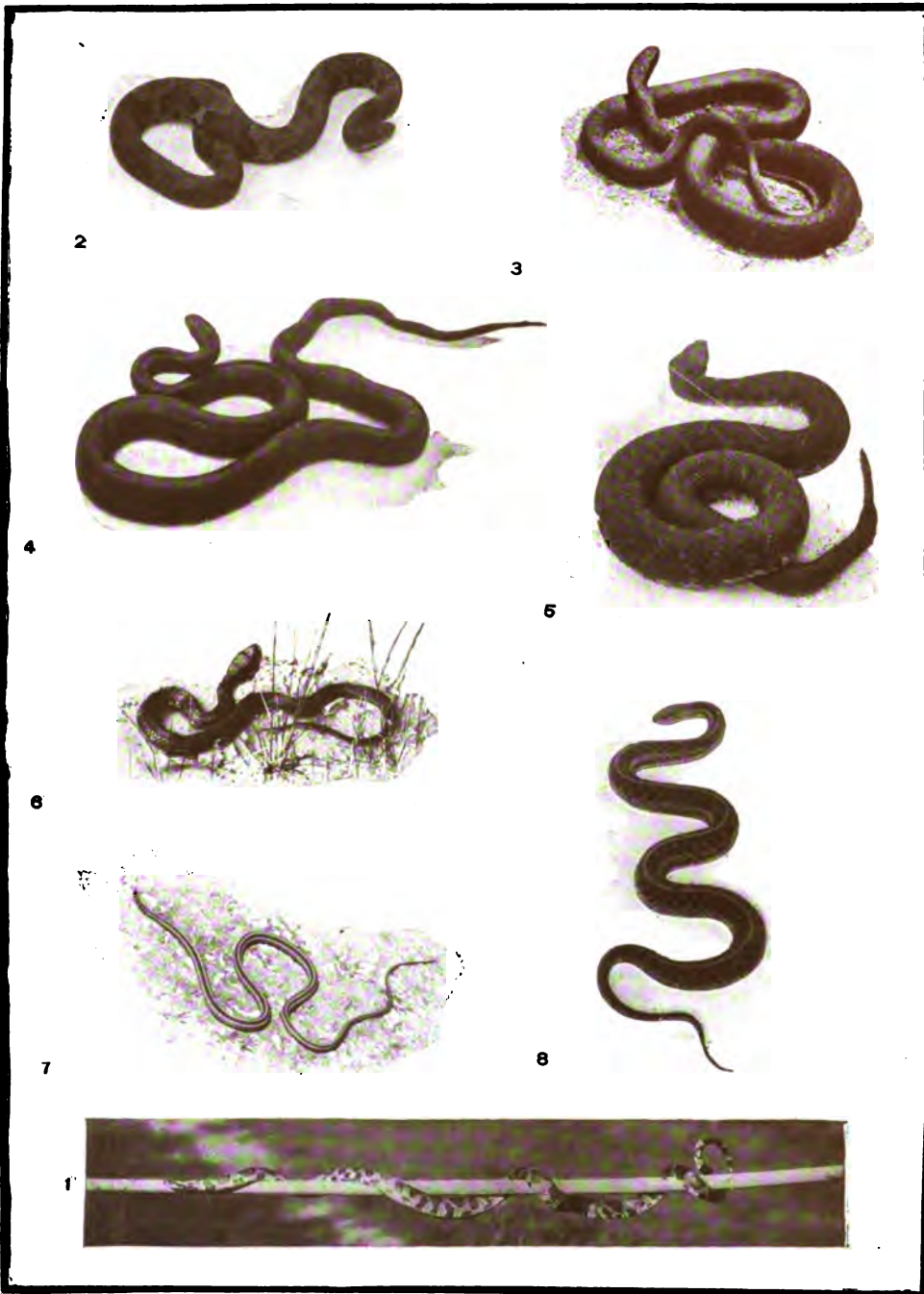
Serpents, or Snakes, reptiles of the saurian class *Ophidia*, characterized by an elongated, cylindrical, limbless, scaly form, and distinguished from lizards (q.v.) by the fact that the halves (*rami*) of the lower jaw are not solidly united at the chin, but movably connected by an elastic ligament. The vertebrae are very numerous, gastrocentrous, and procelous, that is, hollow in front and convex posteriorly. Each vertebra is connected with its neighbors by free ball-and-socket joints, horizontal connecting projections preventing twisting, while admitting of considerable vertical and horizontal play; and bears ribs, which may exceed 300 pairs in number. No front limbs, sternum or sacrum are ever developed, but vestiges of ancestral hind limbs remain in the boas, pythons and closely related forms, and in some lowly burrowing groups. The ventral tips of each pair of ribs are fastened to opposite ends of one of the abdominal scutes (gastrosteges), forming a mechanism for locomotion in the absence of legs. Progression is by three methods. "The animal," says Stejneger, "may glide, perhaps in a perfectly straight line, by use of its ventral scutes, each, on finding some resistance, forcibly pushing the animal forward. It may walk, by allowing each scute to act as a pair of feet, the lateral portions being alternately carried forward and pushed back; an undulatory movement, like that of myriapods, would result from this mode. The third method is by pushing, as the underground snakes do almost exclusively. Ordinarily ophidians combine the three methods. The sea-snakes progress by an undulatory movement, and by the sculling action of the paddle-like tail. . . . It is impossible for any ophidian to jump, and it is with extreme difficulty that more than the anterior half of the body can be raised, unassisted, from the ground."

Structure.—The skull of serpents consists of a series of bones homologous with the cranial bones of other vertebrates, but slight and, outside of the brain-box, joined by elastic ligaments, permitting great distention of the mouth and throat, so that serpents are able to swallow objects of large bulk. This arrangement is further facilitated by the quadrate bone, which articulates the lower jaw with the skull, being movable. The jaws are provided with hooked teeth of conical shape, ossified to the jaws, but not lodged in distinct sockets, which are useless for mastication, and are of service only in holding the prey in the mouth. The teeth are never permanent, but are capable of being re-

newed, like those of fishes, whenever the old ones become worthless. Valuable characters in classification are derived from the conformation and disposition of the teeth. Thus in the typical, non-poisonous serpents, both jaws and the palate bear continuous rows of solid conical teeth, and the upper maxillæ are immobile. In the viperine snakes simple conical teeth are absent on the upper maxillary or jaw bones, which are of small size, and can be moved upward or downward at will. The upper maxillæ in these latter snakes further bear each a so-called "poison-fang," an elongated canalculated tooth perforated by a canal which communicates internally with the duct of the poison-gland. These fangs are capable of being elevated or depressed. (See RATTLESNAKES; VIPERS.) As regards their internal structure serpents present few points requiring notice. The digestive system comprises large salivary glands, a distensible gullet, stomach, and intestine, which terminates in a cloaca—the external opening of the cloaca being transverse in conformation. There is no urinary bladder, yet serpents drink a great deal of water, and must have it in abundance when kept in captivity; at the same time, they have remarkable powers of long fasting. The heart (see REPTILES) consists of three chambers only—two auricles and a ventricle, the circulation being of the mixed character characteristic of reptiles and amphibians. The lungs, ovaries and other paired or symmetrical organs exhibit an abortive condition of one of these structures, the left lung, for example, far outgrowing the right one, and doing all the work. "The trachea is long and may be provided with air-cells, and the larynx can be projected during the tedious process of swallowing, when, too, the air-cells and the posterior reservoir come into play." All these modifications are in adaptation to the slender, elongated form of the animal, and to its methods of life. The sexes are perfectly distinguished, and the penis of the male consists of a pair of organs (hemipenes), grooved on their inner sides, which when erected are pressed together and so form a tubular intromittent instrument. The special modifications of this organ constitute one of the most stable "characters" or criteria by which to classify the sub-divisions of the *Ophidia*. The eggs of the viperine, and some other snakes, are retained within the oviduct of the female until the young escape, so that these species are ovo-viviparous. In the majority of serpents, however, the eggs, which are oblong and have a leathery integument, are deposited in warm soil, among rotting wood, in heaps of decaying vegetation or in some similar warm and concealed place, where they are left to mature; but the pythons coil about their eggs and incubate them by the feeble heat of their bodies; and all kinds wait for and protect their young when born. It is true, to a limited degree, that at times of danger, the little snakes take refuge in the capacious mouth and throat of the mother.

Sense-organs.—The senses of serpents vary in respect to acuteness. The skin is highly sensitive to touch, and a few snakes have tentacle-like outgrowths upon the muzzle supposed to be "feelers"; this sense is principally developed, however, in the tongue, which is thread-like, forked at the end, usually black, very long, and far-protrusible through a notch in the upper lip.

AMERICAN SERPENTS.



1. Milk Snake.
2. Copperhead.
3. Blacksnake.
4. Mountain Blacksnake.

5. Eastern Rattlesnake.
6. Water-snake.
7. Ribbon-snake.
8. Garter-snake.

when the mouth is closed. With this tongue—mistaken by the ignorant for a “sting”—the animal tests the quality of all objects as it moves about, and gains most of its information. There are no external ears, but the hearing in some, if not in all, is good. The nostrils are at the tip of the snout, and the sense of smell is keen,—serpents find and follow their prey mainly by its aid. The eyes of serpents have no eyelids, yet they sleep; a watch-glass-like layer of the skin overlies and protects the ball, and peels off in the annual exuviation of the outer skin (see *MOLTING*). The pupil is usually round, but in the boas and some others is a mere vertical slit.

Phylogeny.—Serpents are the latest and highest development of the reptilian type, and seem to be the only representatives of the class which are now flourishing rather than declining. They are distributed principally in the warmer regions, only the smaller forms extending into the northern temperate zone. Where the climate is even moderately cold in winter snakes creep into animals' burrows, holes among loose rocks and other underground places, and undergo hibernation,—often many entwined together, especially toward spring, when they are seeking mates. A similar retirement (*æstivation*) occurs in countries exposed to annual periods of heated drought. By far the greater number of ophidians are terrestrial, although some are arboreal, others amphibious and a few exclusively marine. About 400 recent genera and nearly 1,800 species are known, but only about 35 fossil forms, according to Eastman, who reminds us that many fragmentary remains of Cretaceous age, at first regarded as ophidian, are now known to be dolichosaurian. Tertiary snakes can hardly be distinguished from modern species, and occur in all parts of the world, including the Eocene of New Jersey and the Eocene and Miocene of the Rocky Mountain region. These remains and other considerations make it plain that the serpents are an outgrowth from the same ancestral stock (*Sauria*) as the lizards.

Classification.—The following is a progressive arrangement of families, from lowest to highest in organization, some of them including several groups formerly regarded as separate families:

1. *Typhlopidae*. Burrowing snakes of Southern Asia and the islands of the Indian Ocean. Have vestiges of the pelvis and the eyes covered by skin.

2. *Glauconidae*. Replace the *Typhlopidae* in Africa and tropical America.

3. *Ilysiidae*. Burrowing snakes of the tropics with vestigial hind limbs. Tail short and blunt (blind snakes).

4. *Uropeltidae*. Burrowing snakes of Ceylon and Southern India. Tail truncate, ending in a flat shield (shield-tails).

5. *Boidae*. Large, typical snakes, with rudiments of hind legs and pelvis, and ventral scales transversely enlarged. The family comprises about 70 species, found all over the world in tropical and subtropical countries, and noted for their rapacious habits and ability to crush animals, large as compared with themselves. Typical genera are *Python*, with about 20 Palæotropical and Australian species, and one in Mexico, and *Boa*, which has many South American species and a few in Madagascar.

6. *Xenopeltidae*, one Malayan species (*X. unicolor*).

7. *Colubridae*. Includes 90 per cent of all snakes; the pterygoid bone reaches the quadrate. It is divisible into three series: (1) No teeth grooved; (2) the posterior maxillary teeth grooved (poison-fangs); (3) the anterior maxillary teeth grooved (poison-fangs). The first includes the non-venomous colubrine snakes of over 1,000 species, such as the blacksnake, garter-snake, water-snake, hog-nose, and the ordinary harmless serpents of all parts of the world. The second group (2) comprises opisthoglyph, partly poisonous snakes, found in the tropics of both continents, terrestrial, aquatic, even marine species. The third group (3) contains many violently poisonous, proteroglyph snakes. Here fall the cobras, coral snakes and other elapine serpents, whose bite is to be dreaded.

8. *Amblycephalidae*. Tropical snakes, in which the ends of the pterygoids are free, not reaching the quadrates. Harmless, but resembling poisonous snakes.

9. *Viperidae*. Maxillaries, short and movable, so as to erect the poison-fangs, which are the only maxillary teeth. Two subfamilies: (1) the Old World vipers (q.v.); (2) the rattlesnakes (q.v.) and related pit-vipers.

Bibliography.—Dumeril et Bibron, ‘*Erpetologie générale*’ (Paris 1854); Stejneger, ‘*Standard Natural History*,’ Vol. III. (Boston 1885); Boulenger, ‘*Cat. of Reptiles in the British Museum*’ (London 1889-96); Gadow, ‘*Amphibia and Reptiles*’ (New York 1901); Fayer, ‘*Thanatophidia of India*’ (London 1874); Ewart, ‘*Poisonous Snakes of India*’ (London 1878); Krefl, ‘*Snakes of Australia*’ (Sydney 1869); Holbrook, ‘*North American Herpetology*’ (Philadelphia 1842); Cope, ‘*Crocodylians, Lizards and Snakes of North America*’ (Washington 1900). The last named is the most complete work on American serpents and is published by the Smithsonian, in whose annual reports and other publications will be found much other valuable information, especially the contributions by Yarrow, Stejneger, Mitchell and Hay.

ERNEST INGERSOLL.

Serpukhov, sër-poo-höf', or **Serpuchow**, Russia, a town in the government of Moscow, on the Nara River, 57 miles southwest of the city of Moscow, comprises three divisions. One of these, the Fort, is enclosed by walls, now in ruins. An ancient cathedral is the only building worth noting. Agriculture is an important industry, and there are manufactures of wool, cotton, leather, paper, chemicals, etc. An active trade with the interior is carried on, especially over the Oka River.

Ser'pula, a tube-making marine chaetopod worm (see *CHAETOPODA*), which often lives and reproduces its tubes in such close proximity over considerable areas as to form, with the cemented fragments of coral, sea-shells, sand, etc., caught among its entwined tubes, large masses of rocks. Such are to be seen on the coast of Florida.

Serra da Estrella, sãr'rã dã ês-trãl'yã, Portugal, in the province of Beira, is the highest range of the country, attaining an altitude of 6,540 feet. It belongs to the Guadarramas system, and is a continuation of the Gata range in Spain, terminating in the Serra de Lousão.

SERRA DO MAR—SERTORIUS

Numerous lakes, some of which are warm, occur in the ridge, and the rivers Condicira and Unhaes form fine cascades. The surrounding scenery is remarkably picturesque.

Serra do Mar, doo mār, Brazil, a range of mountains running along the southeast coast from the state of Rio Grande do Sul toward Bahia. It is not a single connected chain, and is known under various names, such as Serra Gerae in the south and Serra dos Aimores in the north. It forms the eastern edge of the great Brazilian plateau, and is the true divide between the Atlantic Ocean and the Paraná and San Francisco basins, though its crest is nowhere more than 100 miles from the coast. Opposite Rio de Janeiro the range forms a succession of weathered granite pinnacles which are known as the "Organs." The highest point is about 7,500 feet above sea-level.

Serranidae, a family of acanthopterygian bony fishes typified by the sea-bass (q.v.). The body is generally rather short and heavy, slightly compressed, with a moderate or large head and covered with usually ctenoid scales. The mouth is usually large and is provided with numerous teeth all of one kind arranged in broad bands on the vomer and palatine bones as well as on the jaws. The fins are well developed and the dorsal spines usually large and strong but variable in number. Sometimes the dorsal and caudal fins are furnished with filaments or streamer-like appendages. The swim-bladder is usually comparatively small and attached to the body walls. This is a large family of carnivorous fishes, including about 70 genera and more than 400 species, almost all of which are marine and especially abundant in tropical waters. They are closely related to the *Percidae* and, like that family, include a large number of valuable food-fishes. In North American waters no less than 28 genera and 90 species are found, almost all of which are good and a number very important food-fishes. Among them may be mentioned, in addition to the sea-bass, the striped bass, white perch, yellow bass, jew-fish, groupers and squirrel-fish, most of which are described elsewhere in this work. Consult: Jordan and Eigenmann, 'Review of the Serranidae'; Bull. U. S. Fish Com. (Washington 1890).

Serrano y Dominguez, sēr-rā'nō ē dō-mēn'gāth, Francisco, DUKE DE LA TORRE, Spanish statesman: b. Anjonilla, Andalusia, 18 Sept. 1810; d. Madrid, Spain, 26 Nov. 1885. He entered the military college in 1822, became an ensign in 1825, and served in the coast guard until 1833, but after the death of Ferdinand VII. he gained favor with Queen Isabella and espoused the cause of the child queen Isabella II., against the Carlists. He played an active part in the troublous politics of Isabella's reign, at times holding high offices in the administration and again at variance with the ministry. For implication in the insurrection of Saragossa in 1854 he was exiled and in June returned and took part in the successful revolution of Espartero and O'Donnell. In 1857 he was sent as ambassador to Paris and in 1860 he went to Cuba as captain-general. In 1866, after the overthrow of O'Donnell's government, Serrano was banished, but in 1868 returned, assisted in overthrowing the queen's army and forced her

to leave the country. He then acted as regent until the accession of Amadeus of Savoy in 1870. He was successful in his warfare against the Carlists both in 1872 and in 1874, and during much of the latter year was at the head of the government. He resigned the monarchy into the hands of Alfonso XII., in 1875, but continued active in political life, and in 1883 was appointed ambassador to France.

Serrell, Edward Wellmann, American civil and military engineer: b. 5 Nov. 1826; d. New York City 25 April 1906. He entered the engineering profession and was employed on the Erie railroad, the Central railroad of New Jersey, the Panama survey, the Niagara bridge, the Hoosac tunnel, and other large engineering works. He was an assistant to the chief of topographical engineers, United States America; entered the Federal engineer corps as a colonel in the Civil War; was at the capture of Fort Wagner and devised the "Swamp Angel" battery that shelled Charleston, S. C. He became chief engineer for the Department of the South, and was in 126 actions, being brevetted brigadier-general. He suggested improvements in guns and gun-carriages, and issued some 50 reports on railroads and bridges.

Serres, Dominic, English marine artist: b. Auch, Gascony, 1722; d. London 1793. He is said to have been a nephew of the archbishop of Rheims and was intended for the Church, but this not suiting his taste he ran away from home and became a sailor, eventually becoming master of a Spanish trading vessel. Being taken prisoner by a British warship, he was taken to England, where he afterward resided. Having had some instruction in drawing, he commenced life in his adopted country as a painter of naval pieces, for which the wars of the period furnished subjects. Serres became a member of the Incorporated Society of Artists in 1765 and exhibited with them for two years. On the establishment of the Royal Academy in 1768 he was chosen one of the foundation members. Among the pictures exhibited by Serres at the Royal Academy were 'The Siege at Fort Royal, Martinique' (1769), and 'The Engagement between the Serapis and the Countess of Scarborough with Paul Jones and his Squadron' (1780). In 1792 he was appointed librarian to the academy, and also marine painter to George III.

Serres, John Thomas, English marine artist: b. London December 1759; d. there 28 Dec. 1825. He was the elder son of Dominic Serres (q.v.), and followed his father's profession. In 1780 he began to exhibit at the Royal Academy. In 1790 he went to Italy to further study his art. In 1793 he succeeded his father as marine painter to the king and was also appointed marine draftsman to the admiralty. In 1801 he published a translation of 'The Little Sea-Torch,' a guide for coasting ships, and in 1805 his 'Liber Nauticus,' or instructor in the art of marine drawing. He had married in 1791, and although legally separated from his wife in 1804, her pretensions to be the Princess Olive of Cumberland involved him in many difficulties throughout the latter part of his career.

Sertorius, sēr-tō'rī-ūs, Quintus, Roman general: b. Nursia, Italy, about the end of the 2d century B.C.; d. Asia Minor 72 B.C. He

SERUM—SERUM THERAPY

served with distinction under Marius against the Teutones and in Spain, and held the office of quaestor in Cisalpine Gaul, but becoming embroiled in a quarrel with Marius, who had opposed his election as consul, he fled to Spain, where he collected a force to oppose the army of subjugation sent by Sulla to subdue that country. But the means of Sertorius were unequal to the conflict, and embarking at New Carthage he passed into Africa and successfully commanded the subjects of Mauritania, who were in revolt against their king. This success gained him the confidence of the Lusitanians, who placed him at the head of the large force with which they were opposing Sulla, and Sertorius withstood for a number of years a much superior force of Romans successively commanded by Annii, Metellus Pius, and Pompey. But Sertorius loved Rome and fought with reluctance against its forces. He therefore now accepted the offer of Mithridates, 3,000 talents and 40 ships of war, to ally himself with him in an effort to recover Bithynia and Cappadocia. Sertorius received the sum and was making preparations to push the war, when he was slain through the treachery of Perperna, who had joined him two years before and who now assassinated him at a feast.

Serum, a thin watery fluid, secreted by the serous membranes of the body. Blood-serum is a pale, yellowish liquid, obtained by drawing blood from the vessels and allowing it to separate into a thicker and a thinner portion, of which the thinner part is the serum. Blood-serum consists of proteid substances, fats, extractives, and saline matter. The solid contents of it is 9.22 in males, and 8.29 in females, the rest of it being water. There is also a serum of chyle and a serum of lymph. In chemistry serum is the opalescent liquid, containing milk-sugar and various salts, which separates when milk is curdled by the action of acids, rennet, etc.

Serum Therapy, a mode of treatment of disease by means of the modified blood serum of man or other animal. It is one of the subdivisions of therapeutics (q.v.) and in its more scientific details is of distinctly modern development. In its early and crude forms, however, serum therapy is of very great antiquity. Serum therapy is employed both for its protective power as well as for its curative aid. Inasmuch as the gradual growth of knowledge concerning the protective power of blood serum has been in large part an offshoot of the study of bacterial poisons it is usual at the present time to include under the study of serum therapy a number of related subjects—particularly the effects of bacterial toxins in disease, hence they will be included in this account. It is related that King Mithridates knew that by taking small doses of snake poison he might render himself immune to larger doses and in this old, well-recognized principle one sees the early shadowings of the principle of isotherapy—that principle now so fully recognized that after all the body tissues are the best defense against infectious diseases. The exact details of all the protective processes are not as yet known, but enough have been discovered to place serum therapy on a sound basis. It has been known for a long time that many infectious diseases rarely attack a person a second time. This is

characteristically true, for instance, in measles, scarlet fever, and whooping cough. It is less true for diphtheria, for typhoid fever, for pneumonia. When the discovery of bacteria made it evident that many of these diseases were due to these low plants, it was then shown that injections of the bacteria caused the disease, and that a certain grade of immunity was produced. Following this it was learned that it was not necessary to inject the bacteria themselves to get symptoms of the disease, but that the injection of the filtered products of their growth, that is, their toxins, might cause the same phenomena, and finally it was shown that as a result of the injections, either of the bacteria, or of their dead bodies, or of their filtered toxins, certain changes took place in the blood, and that new substances were formed in the blood which in different ways counteracted the effects of the injections; finally it was a logical step to develop these anti-bodies—as they have been called,—in the blood serum of another animal, and use this serum in the treatment of the particular disease in man. This is the simple explanation as applied in the serum therapy, say of diphtheria. After the success of the anti-diphtheritic serum became established it was thought that all of the infectious diseases would be immediately conquered by an application of the same principle, but in practically all instances it was found that whereas the principle worked out very definitely for diphtheria, it did not apply to other infectious diseases as directly, and the results while at times were seemingly excellent, at other times were very disappointing. This disparity between the good success in diphtheria with antitoxic sera and the lack of results in other infections served to draw attention to the fact that the protective mechanisms in the blood serum were much more complicated than was at first thought. A new line of study was opened when it was shown that in some instances following the use of protective sera, the bodies of injected bacteria were found to be destroyed, that is, bacteriolysis resulted from the use of the serum. Thus in addition to a chemical antidote, antitoxic serum, a bacteria-destroying serum became a possibility. It is highly probable that in tuberculosis this bacteriolytic action of the blood serum is constantly at work. At about the same time, or even previously, the peculiar power that certain blood sera possessed in agglutinating, or causing bacteria to clump up and hang together was observed in typhoid fever. This led to the discovery that certain specific substances, called agglutinins, were present in certain instances and that these agglutinins were protective devices elaborated by the body in its struggle with infectious micro-organisms. This peculiar property of agglutinating bacteria has developed one of the most reliable of tests—the so-called Widal reaction for the detection of typhoid fever. Thus far practical agglutinating sera have not been devised. Agglutination seems to be an active factor in immunity rather than a passive one. As shown in our article on IMMUNITY two distinct phases are present, an active and a passive immunity, and at the present time it is the endeavor of serum therapy to bring into defensive action as many of the factors as possible. Thus by injecting into the human body living bacteria, which have had their virulence

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modified, either by growing them in oxygen, or by attenuation through growth in certain animals, or by subjection to high temperatures, or by growth in weak antiseptic media, a certain type of active immunity may be conferred. This principle is made use of in Haffkine's anti-cholera injections. In the sera used in combating the plague and in immunization against typhoid, injections of the dead bodies of bacteria are practised. Finally active immunity may be induced by the injections of filtered bacterial toxins. These three types of treatment apply the principle of prevention however. They are meant to so enhance the protective agencies of the blood serum that infection shall not take place. They are not in any sense of particular service after the disease has once begun. They are only the first stages in the development of a curative blood serum. As illustrations of these methods the following may be mentioned: (1) Pasteur's preventive inoculations against anthrax in sheep—highly successful. The immunity lasts about a year (see ANTHRAX). (2) Jenner's vaccination against smallpox (see SMALLPOX and VACCINATION). (3) Haffkine's anti-cholera inoculations. Large bodies of men in India have been inoculated first by an attenuated virus, then by a strong virus. The results thus far are not conclusive, but they are encouraging (see CHOLERA). (4) Haffkine's anti-plague inoculations. (See PLAGUE, BUBONIC.) In this the dead bacteria of the plague and their toxins are injected. These are prepared in a specified manner. According to recent reports of the Indian Commission the results are highly satisfactory, but better methods for standardizing the dosage are desirable. Other methods of combating the plague after it has attacked the body are in vogue. These belong to the section on passive immunity modes of treatment. Yersin and Lustig have developed these sera. (5) Wright's anti-typhoid inoculations. In this dead bacteria and their toxins are also used. The results reported from time to time are encouraging. In India of 4,502 soldiers inoculated only about 1 per cent contracted the disease, whereas of 25,000 uninoculated soldiers in the same station 2.5 per cent contracted the disease. Later reports, 'British Medical Journal,' 1904, show even better results, but the technique of Wright's injections leave much to be improved upon. (See TYPHOID FEVER.) (6) Pasteur's method of treatment of hydrophobia is an application of these same principles. In this the body is slowly immunized by using modified virus grown in a special medium, the spinal cord of dogs or rabbits, and before the actual infection takes place, immunity is effected during the incubation period of the disease. (See HYDROPHOBIA.) (7) Maragliano's anti-tuberculosis vaccination. This is one of the most recent (1904) of the efforts to confer immunity in this dread disease. This investigator after a number of years of experiment both in laboratories and in hospitals believes that it is possible to produce a specific therapy for tuberculosis. He has been able to immunize lower animals against the disease and his methods offer much hope for successful human immunization. The main principle of Maragliano's therapy is to create a peripheral focus of tuberculous inflammation without living tubercle bacilli and bring about by this means the active production of defen-

sive materials. These defensive materials are antitoxins, bacteriolysins and agglutinins. It is yet too early to pronounce upon Maragliano's success, but his studies have served to re-awaken a keen interest in the serum treatment of this disease which by reason of many failures had almost become despondent. The good work done by Trudeau in this country will probably commence to bear fruit under the magnificent philanthropy of the Phipps Institute for the Study and Cure of Tuberculosis. A large number of immunization methods have been devised for other diseases, and others will be tried, but up to the present time, those just enumerated alone seem to offer real hope for results. It is needless to point out that all of these advances have come through the honest workers in the medical profession. Secret commercial enterprises are notoriously unreliable and border on quackery if not criminality. All of the methods which have just been enumerated are prophylactic rather than curative. They seek to prevent the diseases in question. The use of antitoxic and antibacterial sera—serum therapy in the narrow sense—is meant to be distinctly curative of the conditions after infection has definitely taken place. Technically speaking these sera bring about what is known as passive immunity. At the present time two distinct kinds of sera are being used. (1) Antitoxic sera and (2) Antibacterial sera. In both of these antibodies are developed in the serum of another animal. (1) The antitoxic sera are the most promising—that for diphtheria (q.v.) having been proven to be the most efficient. Concerning its value there is at the present time almost no doubt. A great reduction in the mortality of diphtheria has resulted since the beginning of its use by Behring in October 1894. Anti-diphtheritic serum is developed in the horse. The process of manufacture is described elsewhere. It is important that in practice the serum should be used early in the disease, as it has been shown that the mortality of the disease is only about 7 per cent when treatment has been begun on the first or second day of the disease, while after the fifth day it seems to be of little service. The amount to be given is very difficult to determine. The other most important antisera are for streptococcus poisoning (blood poisoning), for tetanus, for plague, for pneumonia, and for snake bite. Others may in time be developed. In the treatment of acute tetanus (q.v.) (lockjaw), the results have not yet proven absolutely satisfactory, some patients have seemed to be benefited, others not. Two sera are in use. (1) Behring and Roux; (2) Tizzoni. It seems that the latter serum is the more successful. Some have ascribed this to a diminished virulence of the tetanus organism in Italy. A serious bar to a successful therapy is present in this disease in the great resistance shown by the nerve-cells to the diffusion of the serum. To obviate this, intraspinal and intracranial injections of the serum have been practised. The results have not yet proven more satisfactory.

The antistreptococcic sera are in the experimental stage only. Just why results have not been obtained is not yet clear, but there are many different kinds of these streptococci and it may be that each form has its own particular type of poison that can be counteracted only

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by a serum developed with a similar form. The subject is slowly emerging from a highly technical condition and better results may be hoped for. Very striking results have been obtained from some of the antivenen sera, particularly in treating the cobra poisoning (see **SNAKE POISONS**) by Calmette's serum, but the subject is still in the experimental stage. Antipneumococcic sera are not yet available. Such will constitute a great blessing when they finally are evolved. The natural history of pneumonia, and the known characters of the pneumococcus, both offer considerable theoretical hope that an efficient anti-pneumonia serum can be manufactured.

True bacteriolytic sera have not yet been devised as specific means of therapy. Such sera, as Yersin's anti-plague serum, which have been made are thought to act partly as antitoxic, partly bacteriolytic, but all of the details are not yet available. Very recently the suggestion has come from Ehrlich that immunity to Protozoan diseases is possible. Summarizing the results then of serum therapy it may be said that (A) active immunity can be imparted with great hope of success in (1) Smallpox, (2) Rabies, and (3) Anthrax, in animals; with reasonable hope of positive value in (1) Cholera, (2) Typhoid, (3) Plague, and (4) Tuberculosis. That (B) curative antisera are of positive value in (1) Diphtheria, and (2) Snakebite, and that hopeful results have been obtained in (1) Tetanus, (2) Plague, (3) Dysentery, (4) Pneumonia, (5) Blood-poisoning (streptococcus), (6) Scarlet Fever. Further studies may bring more into both the hopeful and positive class. See **BACTERIA**; **BACTERIOLYTIC**; **IMMUNITY**; **INFECTION**; **PATHOLOGY**; **TOXIN**; **TOXICOLOGY**.

Bibliography.—Wassermann, 'Immune Sera' (1904); Waldheim, 'Die Serum-Bakterientoxin und Organ Präparate' (1901); Encyclopedia Medica Article, 'Therapeutics—Serum Therapy'; Buck, 'Reference Handbook of Medical Sciences.' The most exhaustive treatment may be found in Wassermann and Kolle's large four volume work on bacteria, 'Handbuch der Pathogenen Mikroorganismen.' Maragliano's latest work on tuberculosis in 'Medical News,' 2 April 1904.

SMITH ELY JELLIFFE,
Editor 'Journal of Nervous and Mental Disease.'

Serval, a large African wildcat (*Felis serval*), yellowish in color, long-legged, and thickly spotted with blackish, which also appears as bars on the legs and rings around the tail. It may exceed three feet in length, besides 15 inches of tail. Its fur is highly valued for its beauty. A smaller species or variety (*F. servalina*) is called by Mivart the servaline cat. Consult Mivart, 'The Cat' (1892).

Servants. See **LAW OF FAMILY, THE**.

Servants of Mary. See **ORDERS, RELIGIOUS**.

Servetus, sér-vě'tūs, Michael (properly Miguel Servete), Spanish scholar: b. Tudela in Navarre 1511; d. Geneva 27 Oct. 1553. He was the son of a notary, who sent him to Toulouse for the study of the civil law. Excited by the discussions of the Reformers in that city, he began to give his attention to theology, and having formed views of the Trinity antago-

nistic to the orthodox doctrine, removed to Germany and there printed a tract, entitled 'De Trinitatis Erroribus' (1531), which production was followed next year by his 'Dialogorum de Trinitate Libri Duo.' But he found that the expression of his opinions was obnoxious in Germany, and made his escape to France, under the name of Michael of Villa Nueva. He engaged for some time with the Frellons, booksellers of Lyons, as corrector of the press, then went to Paris, where he studied physic, and graduated as doctor. At Paris Servetus met Calvin for the first time, and after several meetings an arrangement was made for a theological discussion between them, but Servetus failed to appear. Soon after he quarreled with the medical faculty at Paris, and quitted the city (1538). He first repaired to Charlieu, near Lyons, where he practised three years. In 1538 Servetus published his matured theological system, without his name, under the title of 'Christianismi Restitutio.' The magistrates of Vienne ascertained the name of the author, and Servetus was committed to prison, whence he contrived to escape. Purposing to proceed to Naples he took his way through Geneva, where he was apprehended by the magistrates on a charge of blasphemy and heresy. In order to insure his condemnation his various writings were sifted for accusations. The magistrates of Geneva were, however, aware that many eyes were on them in respect to this extraordinary treatment of a person who was neither a subject nor a resident, but properly speaking, a traveler kidnapped in his passage. They thought proper, therefore, to consult the magistrates of all the Protestant Swiss cantons, who, referring the matter to their divines, the latter unanimously declared for his punishment, Calvin being especially urgent and emphatic as to the necessity of putting him to death. As he refused to retract his opinions, he was condemned to the flames, which sentence was carried out. Servetus is numbered among the anatomists who made the nearest approach to the doctrine of the circulation of the blood, as appears from a passage in his 'De Restitutione Christianismi.'

Servia, sér-vī-ā, an independent kingdom in Europe, forming anciently a part of Mæsia, and till recently a portion of the Turkish dominions; bounded north by Hungary, from which it is separated by the Save and the Danube; east by Wallachia and Bulgaria; south by Turkey; and west by Bosnia, from which it is separated on the greater part of this frontier by the Drin. The area is 19,050 square miles, and the population, according to the census of 1900, was 2,493,770. The inhabitants are chiefly Rumanians, but include a considerable number of Rumanians and Gypsies.

Topography.—The surface has a general slope toward the north, and is on the whole mountainous, being traversed by ramifications of three great mountain chains—those of the Carpathians in the northeast, of the Balkan in the southeast, and of the Dinaric Alps in the west. The summits are of no great height, however, and seldom exceed 3,000 feet. The whole surface belongs to the basin of the Danube, which receives the drainage partly directly and partly by the frontier river Save, augmented by the Drin and the Timok, but most of all by the

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Morava, which, besides flowing in a main stream from the centre of the principality north to the Danube, receives two larger branches under the names of the East and West Morava, and is fed by numerous affluents in the whole line of its course.

Climate and Vegetation.—The climate of Serbia is somewhat rigorous in the more mountainous parts, but very mild in the valleys and plains, especially those open to the south and sheltered by hills in the north. Vegetation is vigorous, both in the mountainous districts and in the lower grounds, the former being generally covered with forests of excellent timber-trees, among which, where the elevation is not very great, the walnut is conspicuous, and the latter being generally covered with a fertile soil, well adapted for various fruits and cereals, plums in particular among the former. The principal agricultural products are maize, wheat, rye, barley, oats, hemp, flax, and tobacco. Wine is grown in the districts adjoining Hungary. Large numbers of cattle, sheep, and pigs are reared. The minerals include copper, lead, iron, and coal. The first occurs particularly in the northeast; the second occurs also chiefly in the northeast, at Tanda and Lonka, but it has been partially worked also in the west and southwest; iron is pretty generally diffused, but is not in many places workable.

Commerce and Industries.—Manufacturing industries can scarcely be said to exist, although in quite recent times government has done much to encourage them. Trade is chiefly carried on with Austria. The chief exports are cereals, dried plums, and live stock, including hogs. The imports of the kingdom amounted in 1900 to \$10,000,000, and the exports to \$13,000,000. The railways have a length of 354 miles. There are 2,550 miles of telegraph. Serbia has introduced the French decimal system for its moneys, weights, and measures, but the old Turkish and Austrian weights and measures are still to some extent in use.

Religion.—The Servians are Slavonians by race, and the great majority of the inhabitants adhere to the Greek Church. According to the census taken in 1891 there were 16,764 Mohammedans, 11,596 Roman Catholics, 1,149 Protestants, and 4,652 Jews. In 1894 King Alexander revoked the constitution granted in 1889, replacing it by the older constitution of 1869, but several important modifications were introduced in April 1901.

Government.—The executive authority is vested in the king, who is assisted by a council of eight ministers with special departments. In legislation the king has to act through and with the national assembly, known as *Skupsh-tina*, and the senate. The latter consists of 51 members, comprising the heir-apparent, the primate of Serbia, the bishop of Nish, 30 nominated life-members, and 18 elected members. The *Skupsh-tina* consists of 130 members, all elected by the people. An elected member of the senate must be at least 40 years old and must pay an annual tax of 200 dinars. Every Servian of not less than 21 years of age who pays direct taxes to the amount of 45 dinars per annum is entitled to vote in the senatorial elections. Thirty is the minimum age for deputies, and the minimum annual tax is 60 dinars. The right to vote for deputies belongs

to all Servians of at least 21 years old, paying 15 francs annually in direct taxes. The principal source of revenue in Serbia is a proportional capitation tax. The estimated revenue in 1901 was \$14,000,000, and the expenditure was just under that amount. The public debt in 1900 amounted to \$86,000,000. In virtue of the law of 1886, amended by one in 1896, military service is obligatory. The peace strength of the army is about 22,500, and the effective war strength 353,000. The country is divided for administrative purposes into 17 departments, one of them being the town of Belgrade.

Early History.—Serbia was anciently inhabited by Thracian tribes; subsequently it formed part of the Roman province of Moesia. It was afterward occupied in succession by Huns, Ostrogoths, Lombards, Avars, and other tribes. The Servians entered it in the 7th century, and were converted to Christianity in the next century. They acknowledged the supremacy of the Byzantine emperors, but latterly made themselves independent, and under Stephen Dushan (1336-56) the kingdom of Serbia included all Macedonia, Albania, Thessaly, northern Greece, and Bulgaria. About 1374 a new dynasty ascended the throne in the person of Lazar I., who was captured by the Turks at the battle of Kossova (in Albania) in 1389, and put to death. Serbia now became tributary to Turkey. About the middle of the 15th century it became a Turkish province, and so remained for nearly 200 years. By the peace of Passarowitz in 1718 Austria received the greater part of Serbia, with the capital, Belgrade. But by the peace of Belgrade in 1739 this territory was transferred to Turkey. The barbarity of the Turks led to several insurrections. Early in the 19th century Czerny George placed himself at the head of the malcontents, and, aided by Russia, succeeded after eight years of fighting in securing the independence of his country by the peace of Bucharest, 28 May 1812. The war was renewed in 1813, and the Turks prevailed. In 1815 all Serbia rose in arms under Milosh, and after a successful war obtained complete self-government, Milosh being elected hereditary prince of the land. Milosh was compelled to abdicate in 1839, and was nominally succeeded by his son Milan, who died immediately, leaving the throne vacant to his brother Michael. In 1842 this prince was compelled to follow the example of his father and quit the country. Alexander Kara-Georgevitch, son of Czerny George, was elected in his room; but in December 1858 he also was forced to abdicate. Milosh was then recalled, but survived his restoration little more than a year. His son Michael succeeded him (1860), but was assassinated by the partisans of Prince Alexander 10 July 1868. The princely dignity was then conferred on Milan (Obrenovitch), grand-nephew of Milosh. After the fall of Plevna in the Russo-Turkish war of 1877-8 Serbia took up arms against Turkey, and by the treaty of Berlin (13 July 1878) it obtained an accession of territory and the full recognition of its independence. It was erected into a kingdom in 1882. In 1885 a short war took place between Serbia and Bulgaria, resulting in favor of the latter. In 1880 Milan abdicated in favor of his son, Prince Alexander, b. 14 Aug. 1876, who became the ruler of the country as Alexander I.

SERVIA—SERVICE-BERRY

Recent History.—In 1800 a regency of three appointed as guardians of the young king practically controlled the government. The Radicals also gained a majority of the National Assembly and formed the cabinet. Factional troubles made the first few years of Alexander's reign exceedingly stormy. In 1802 the three regents dissolved the cabinet, and a new one, composed of Liberals, came in. In 1803, Alexander, then 17 years of age, took matters in his own hands and decided to save the dynasty. He declared himself of age, took away the power of the regents and took the reins of power. He appointed a cabinet, made up mostly of moderate Radicals, and his action nearly precipitated a revolution. In 1804 Alexander appointed a so-called non-partisan cabinet and his father again became head of the army, an act which caused Russia to break off diplomatic relations with Serbia in 1808. In 1804 the king also annulled the new constitution and re-established that of 1808, giving himself more power. But discontent and threatened uprisings caused another change to a freer constitutional government in 1807.

Milan and his son had too many characteristics in common to get on well together, however, so Milan went to the gambling resorts of Europe and finally died an exile in Austria in 1901.

One of the causes of the break between father and son was the king's betrothal and marriage to Draga Maschin in 1900. She was 12 years older than the king and had been a lady in waiting. The Servian ministry declared the proposed marriage preposterous and a menace to the state, and promptly resigned.

King Alexander paid no attention to opposition and married Mme. Maschin in Belgrade on 5 Aug. 1900. Though the marriage had been violently opposed by officials of the government, the people apparently had no objection and heartily cheered the bridal party. The king took the precaution, however, to line the streets with troops. Disturbances and threatened revolution together with quarrels between the king and his wife kept the country in turmoil. In June 1903, a revolt occurred among the army officers, and King Alexander, his wife, and several of his household were brutally murdered in the palace at Belgrade. The conspirators, comprising some of the principal statesmen and chief officers of the army, communicated with Prince Peter, the Karageorgevitch pretender, at Geneva, and, having satisfied themselves that he would accept the throne in the event of its becoming vacant and that he would prove a satisfactory king, they proceeded to put their plans into execution.

It is not wholly clear whether the plot as originally conceived involved assassination of Alexander, the inference being that the murderous scenes in the palace at Belgrade resulted from the resistance which the conspirators encountered on that fateful night when they set forth to obtain from Alexander his abdication and his pledge to leave Serbia. Be this as it may, the plot resolved itself into a most savage onslaught upon the defenseless king and queen by their assailants, who, after having emptied their revolvers upon the ill-fated couple, set to work to slash the body of Draga with their sabres until it had lost all human semblance, after which they pitched both corpses out of

the window into the garden below. On the following morning Peter Karageorgevitch was proclaimed king of Serbia in Alexander's stead, and a week later he arrived in Belgrade and took possession of the blood-stained throne.

Servia, Orders and Decorations of. See ORDERS, ROYAL.

Servian Language and Literature. The Servian language, formerly often called the ILLYRIAN, is a Slavonic dialect, and among all the southern Slavonic idioms the softest and most melodious. It is spoken not only throughout Servia but also by the Herzegovinians and Montenegrins, as well as by the people of Bosnia, Austrian Slavonia, and Dalmatia, the Hungarian Servians, and the Croats. It is closely allied to the Bulgarian and Slovenian, and forms with them the southern Slavonian group. The Servians belonging to the Greek Church use the Cyrillian alphabet, those belonging to the Roman Catholic Church (Croats and Dalmatians) now use the Roman. The Glagol or Glagolitza alphabet was formerly largely used in Dalmatia and Croatia, but is now almost completely obsolete. Recently the Servian has been more cultivated. In 1814 Vuk Stephanovich published in Vienna a Servian grammar (translated into German, with a preface by J. Grimm and remarks by Vater, Berlin 1824). In 1819 he published his 'Dictionary of the Servian Language, with German and Latin Definitions, containing above 30,000 Words in Common Use' (2d ed. 1852). In the Servian poetry, the excellence of which Goethe and Grimm have acknowledged, a Slavonic character of rude energy is united with an Oriental warmth. In 1823 Vuk Stephanovich published three volumes of Servian poetry at Leipsic, which have been translated into German. Some of the songs are uncommonly fine. In 1826 he published 'Danica' (that is, 'Morning Star'), an annual for ladies, in Servian. Not unimportant publications in Servian literature are Simeon Milutinovich's 'Serbianka,' a series of Servian heroic songs, which celebrate the insurrection of Servia, of which he was an eyewitness (four vols. 12mo, Leipsic 1827), and two Servian translations of Horace's 'Ars poetica' (Vienna 1827), in hexameters, and in the heroic measure of the Servians. See also Kapper, 'Volkslieder der Serben' (two parts, Leipsic 1852). Servian prose literature has produced little besides theological and religious works. In fact, the literary dialect is not yet settled: the Servian scholars are not agreed whether the artificial book language, formed after the ecclesiastical Slavonic, and which has been in use for almost four centuries, or the common dialect of the country, shall become the language of literature. Consult Bowring, 'Servian Popular Poetry' (1827).

Service-berry, one of the common names applied to the rosaceous genus *Amelanchier* (q.v.). There are several species in the north temperate zone, the American ones differing chiefly in habitat and in foliage. The leaves are alternate and simple, either toothed or entire, and the five-merous flowers have delicate white petals and are solitary, or more usually in racemes, succeeded by fruits like tiny purplish apples or pears. The species are generally small shrubs, but the *A. canadensis* and *A. botryaphium*,

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the shadbushes and junberries of the eastern United States, occasionally arrive at the dignity of small trees, with hard brown wood. These are the first shrubs to bloom in the East (while the shad are running), and cover themselves with feathery elongated tassels of fugacious petals, while the leaves are still folded. The haw-like fruits, of somewhat insipid flavor, seldom reach maturity, as they should in June, for then the birds are too fond of them to wait for their ripening. This circumstance militates against the proposed cultivation of the junberry.

The *A. alnifolia* is the well-known service-berry of western America, frequently mentioned by explorers of the Rocky Mountain region. The purple, rich, although insipidly sweet, berries are about the size of a pea, with large mucilaginous seeds. They form a favorite food of the aborigines, who cook them or dry them, and add them to dried meat, to form pemmican. They grow upon bushes 2 to 12 feet high, with glabrous thick alder-like leaves, nearly orbicular and coarsely toothed. The wood itself is very hard and tough, but is used by the Indians for arrows and pestles.

The fruit of the white beam-tree (*Sorbus aria* is also called service-berry. See also AMELANCHIER.

Service Men of the Spanish-American War, an association organized at Lexington, Ky., 5 Nov. 1898. The founders of the society made choice of the designation "service men" as equally distinctive of the men who waited in vain for orders to go to the front, and the more favored ones who lived through the exciting scenes of actual conflict. In the list of charter members are to be found the names of many of the most prominent officers in the army during the war with Spain. They represent all sections of the United States and all shades of political belief, and constitute a guarantee of the permanence of the organization.

Service-tree, a round-headed, slow-growing European tree (*Sorbus domestica*) of the *Rosaceæ*, attaining a height of perhaps 60 feet. When without flowers or fruit, it is easily confounded with the ash, having pinnate leaves; but the glutinous winter buds help to identify it. The small whitish flowers, are numerous, and gathered in panicles at the end of the branches, being succeeded by small rounded or pear-shaped fruit, which is only edible when in a state of incipient decay, being astringent while unripe. The wood is hard, solid, and fine-grained, and takes a high polish. It is much in demand for fine cabinet making, for turning, and especially for the screws of wine presses; and is very dear. The service-tree is occasionally cultivated.

Serv'iss, Garrett Putnam, American author and journalist: b. Sharon Springs, N. Y., 24 March 1851. He was graduated from Cornell University in 1872, and from Columbia Law School in 1874. He was editorial writer on the New York *Sun* until 1892, and has since lectured upon history and astronomy. He has published: 'Astronomy with an Opera Glass' (1888); 'The Conquest of Mars' (1898); 'Other Worlds' (1902); etc.

Servites. See ORDERS, RELIGIOUS.

Servitude, the state or condition of a serf, slave, or bondman; state of voluntary or involuntary subjection to a master or employer; service; slavery; bondage; position in life of a servant;—hence, a state or condition of slavish or helpless dependence; as, marriage with a rich and ugly old woman is splendid servitude. In civil law, the right to the use of a thing, without property in the same, for all or for some particular purposes. It consists either in the right to do some act, as to gather fruit from the estate, or to prevent the owner of the property from doing certain acts, as building walls beyond a certain height, blocking up a window, etc.

Servius, Honoratus Maurus, Roman grammarian. He lived at Rome toward the 4th century A.D., and wrote a commentary on the Grammar of Donatus; some lesser grammatical brochures; and a commentary on the poems of Vergil which an unknown author enlarged and enriched with notes of an antiquarian, historical and mythological character. Consult: Thilo and Hagen, 'Servii Honorati Opera' (1878).

Servius Tullius, sér'vī-ūs tūl'ī-ūs, sixth king of Rome: d. 534 B.C. He was the son of a slave, but traditions of his descent vary, some declaring his mother to have been an ordinary slave, and others stating her to have been a noble captive of Tarquin. He was given to the queen, Tanaquil, and educated in the palace of the monarch, where he became so great a favorite as to receive the daughter of Tarquin in marriage. On the death of Tarquin in 578 B.C., Servius, who was immensely popular with both populace and soldiery, was raised to the throne. His reign is singularly free from wars, Livy mentioning but one, and that against the Veii, brought to a speedy termination. His greatness lay in the establishment of civil rights and institutions. He established the census, extended and beautified the city, taking within its limits the hills Quirinalis, Viminalis, and Esquilinus, and building around the city a stone wall which bore his name. He greatly improved the condition of the common people, thereby gaining the enmity of the patricians, whose long accustomed privileges were thus encroached upon, and in 534 Servius was killed as the result of a patrician conspiracy. Another tradition makes him the victim of an ambitious daughter, Tullia, who caused the death of her husband, sister, and father in order to pave her way to the throne as the wife of Tarquin, son of the former king. Consult: Niebuhr, 'Roman History and Critical Examination of the History of Tarquin and Servius.' See also ROME, HISTORY OF.

Serv'us Servo'rum De'i (servant of the servants of God), a title which the popes give themselves. It was used by the Roman pontiffs at a very early period, although Paulus Diaconus states that Gregory the Great (590-604) was the first to adopt it.

Sesame, a rough-hairy, gummy annual plant (*Sesamum indicum*) about two feet high, with petiole, ovate-lanceolate leaves, opposite below and alternate above, slightly toothed, and mucilaginous. The flowers are solitary in the axils, pale or rose-colored, 5-merous, with irregular-lipped corolla, having the tube curved downward and dilated above the oblique base. Sesame has been known from ancient times, originating

SESAMOID BONES — SESTO

In the East, where it is cultivated for the sake of its black or white seeds. It is easily grown, does not object to poor soil, and has even been introduced to gardens in America, for the sake of the leaves, which in infusion are employed as a demulcent medicine for infantile dysentery. The plant has run wild in the Southern States.

The seeds are very tiny, but are sweet and oleaginous, and are much used for food by Oriental peoples, and are imported into Europe for crushing. They will yield half of their weight in oil, which is yellow, limpid, inodorous and keeps for years without becoming rancid. It is of great economic value, only second to coconut oil in the variety of its uses, and can be employed instead of olive oil in a myriad ways, as for culinary purposes, food, medicine (having a laxative effect), cosmetic, illumination, lubrication, soap-making, etc. It is also employed as an adulterant for olive-oil, but is itself adulterated with peanut-oil. It is known as *benne* or *benne*, and as *gingil-oil*. The cake left after the oil has been expressed forms a food for the poorer classes, and is a good food for cattle.

Ses'amoid Bones, certain rounded bodies, at first cartilaginous and then bony, found in the tendons of muscles. They derive their name from their resemblance to sesame. The patella or knee-cap is a sesamoid bone. Another is developed in the upper joint of the thumb, and at the corresponding joint of the great toe, these increasing the leverage of the short flexor muscles of the thumb and great toe respectively. In the great majority of mammals sesamoid bones are much more numerous than in man.

Sesha, sā'sha, an imaginary serpent which, when coiled up, is the Hindu emblem for immortality. It is represented in Hindu mythology as having 1,000 heads, on one of which the world rests, and Vishnu reclines on this immense reptile in the primeval waters.

Sesostris, sē-sōs'tris, the name given by Greek writers to a king of Egypt, about whose identity there is much controversy, while it seems certain that the achievements attributed by the Greeks to Sesostris were the deeds of a number of Egyptian rulers. By many Sesostris is believed to be identical with Rameses II., the son of Seti (the Sethos of Manetho), and the third king of the 19th dynasty. The name of Sesostris is explained as a corruption of Sestura, the popular appellation of this Rameses, or of Sethosis (written by Pliny Sesothis), meaning son of Sethos, by which name the same monarch is designated in Manetho. Others think that the Greek Sesostris may be a corruption of Sesortesen or some similar form, which is the name of one king of the 3d dynasty and three others of the 12th. The Sesortesen of the 3d dynasty is called Sesostris by Aristotle. The identification of Sesostris with Rameses II. has the support of Champollion, Salvolini, and others, but is combated by Bunsen on the ground that some of the most striking achievements attributed by Herodotus and Diodorus to Sesostris do not belong to that Rameses. Such are the victorious expeditions into Nubia and Thrace, the immense development under him of the Egyptian navy, the division of the land and its subjection to heavy burdens. But it is generally admitted, as before stated, that the exploits of various monarchs were united by the Greeks in

their accounts of the reign of Sesostris, which contain a number of fables in addition, so that it is needless to seek for complete correspondence between these accounts and the monumental records of any single reign. Many of the most remarkable deeds of Sesostris may be assigned with great probability to Rameses III., the founder of the 20th dynasty and the restorer of the power and glory of Egypt. He triumphed over the confederations formed against him by various Libyan tribes; annihilated by a great victory gained in Northern Syria a league of Hittites, Philistines, and other Canaanitish peoples, and of tribes inhabiting the isles of the Mediterranean, in which sea he maintained a large fleet to support his operations on land.

Sessions, Court of. See COURT.

Ses'sum, Davis, American Protestant Episcopal bishop: b. Houston, Texas, 7 July 1850. He was educated at the University of the South, Sewanee, Tenn., took orders in 1882, and in 1883 became curate of Grace Church, Galveston, Texas. He was assistant rector of Calvary Church, Memphis, Tenn., in 1883-7; rector at Christ Church, New Orleans, La., in 1887-91, and in the latter year was consecrated bishop of Louisiana.

Sester'tius, an ancient Roman silver coin worth $2\frac{1}{2}$ asses (hence the name *sesquiertius*, the third a half.) The sestertius was the fourth part of a denarius, and when in later times the weight of the as was reduced, and 16 asses were reckoned to a denarius, the sestertius still retained the same proportion to the latter coin, and thus became equal to 4 asses. The value of the sestertius therefore varied with that of the denarius. About the close of the republic, when the denarius is calculated to have been worth about 17 cents, the sestertius would be worth 5 cents. The sestertius was the unit most commonly employed by the Romans in reckoning large sums of money. For sums below 1,000,000 sestertii the ordinary cardinal numerals were used with sestertii or sestertia, as the case might be; but if the sum amounted to 1,000,000 or more a numeral in *ies*, after which *centena millia* (100,000) had to be understood, was connected with sestertium (for example, *quadragies sestertium* is 4,000,000 of sestertii, that is, *quadragies centena millia sestertiorum nummorum*). Sometimes the numeral adverb was used alone, and *decies ei dedit* signifies *decies sestertium*, that is, *decies centena millia sestertiorum*, or 1,000,000. The sestertius was often expressed by the symbol HS, which is explained as a corruption either of IIS, that is, II., the numeral two, and S for *semis*, half or of LLS, for *libra libra semis*, an as having been originally equivalent to a libra or pound.

Sestini, sās-tē'nē, Domenico, Italian numismatist: b. Florence 1750; d. there 1832. He was educated at the school of San Marco. In 1774 he left his native city and went to Sicily, where he received from Prince Biscari the commission to arrange his museum at Catania, and from this time he applied himself exclusively to numismatic studies. He published numerous books, chief among which was his 'Systema Geographicum Numismatum' in 14 folio volumes.

Sestō, sās'tō, Cesare da (CESARE DA MILANO), Italian painter: b. Sesto, near Milan,

about 1480; d. Milan about 1524. He was probably a pupil, certainly an imitator, of Leonardo, and a picture of his in the Prado, Madrid, is put down by Madrazo as a copy of that master's 'Virgin and Child.' 'La Vierge aux Balances' in the Louvre and a 'Holy Family' in the collection of Lord Monson, formerly thought to be by da Vinci, are now attributed to Cesare. He was on friendly terms with Raphael at Rome, and reproduced some of the qualities of that master's style. The mingled influence of da Vinci and Raphael is apparent in his 'Adoration of the Kings' at the Naples Museum. Other pictures of his are: 'Baptism of Christ,' Scotti Gallery, Milan; 'Madonna with St. John,' Melzi Collection, Milan; and a 'Madonna' in the Brera.

Seth, Andrew (Pringle Pattison), Scottish educator: b. Edinburgh, Scotland, 20 Dec. 1856. He was educated at the University of Edinburgh, studied in the universities of Germany for two years, and in 1880 became assistant professor of logic and metaphysics at the University of Edinburgh. He accepted the chair of logic and philosophy at University College of Cardiff in 1883, became professor at Saint Andrew's in 1887, and since 1891 has occupied the chair of logic and metaphysics at the University of Edinburgh. He has published: 'The Development from Kant to Hegel' (1882); 'Scottish Philosophy' (1885); 'Two Lectures on Theism' (1897); 'Man's Place in the Cosmos' (1897 and 1902). He added to his own name that of Pringle Pattison in 1898 on succeeding to certain estates.

Seth, James, Scottish metaphysician: b. Edinburgh 1860. He was educated at the universities of Edinburgh, Leipsic, Jena, and Berlin, and was professor of philosophy at Dalhousie College, Halifax, Nova Scotia, 1886-92; at Brown University, Providence, R. I., 1892-6; was Sage professor of moral philosophy at Cornell University, Ithaca, N. Y., 1896-8; and has been professor of moral philosophy at the University of Edinburgh, Scotland, since 1898. He is the author of 'A Study of Ethical Principles' (1894, 6th ed. 1902).

Seth'ites, a sect in the 2d century that worshipped Seth, the son of Adam, as the son of God, and maintained that he had reappeared on earth in the person of Jesus Christ.

Sethos I., sē'thōs, or Seti, sē'tī, Egyptian king, the second Pharaoh of the 19th dynasty; which lasted from 1462 to 1288 B.C. He was one of the shepherd race or Hyksos in the eastern part of the Delta. Distinguished for magnificence, he built the temples of Osiris at Abydos, and the hall of columns at Karnak. He established by arms the power of Egypt over a large part of Western Asia.

Seton, sē'tōn, Eliza Ann Bayley, American philanthropist, founder of the order of Sisters of Charity of Saint Vincent de Paul in the United States: b. New York 28 Aug. 1774; d. Emmitsburg, Md., 4 Jan. 1821. She was married to William Seton about 1794 and after his death in 1804 she was received into the Roman Catholic Church the next year, and on 22 June 1809 established at Emmitsburg, Md., a community called by her Saint Joseph's Sisterhood. In 1810 the rules of the French sisters were adopted, with modifications suited to American

conditions. The society grew and prospered, and in 1850 a union with the Paris society was effected. In 1846 the New York community became independent of the original American organization. For statistics, consult the article on the society. See de Barbary, 'Vie' (1868); O'Gorman, 'A History of the Catholic Church in the United States' (1895).

Seton, Ernest Thompson, American author, for some time known as SETON-THOMPSON: b. South Shields, Durham, England, 14 Aug. 1860. After a brief course at the Royal Academy, London, he spent three years in zoological study on the Assiniboine in Manitoba, published works on the 'Birds of Manitoba' and 'Mammals of Manitoba,' was made government naturalist of the province, and executed for the 'Century Dictionary' more than 1,000 drawings of animals and birds. In 1890 he became a pupil of Mosier in Paris, whither he returned in 1894 to study with Ferrier, Bougereau, and Gérôme. He exhibited at the salon several drawings and paintings of wolves, his particular subjects. He has published several works which, while generally recognized as of excellent quality from a strictly literary viewpoint, have been criticised from that of natural history. Among these much-read books are: 'Wild Animals I Have Known' (1898); 'The Trail of the Sandhill Stag' (1899); 'The Biography of a Grizzly' (1900); 'Lives of the Hunted' (1901); and 'Woodmyth and Fable' (1904).

Seton, Robert, American Roman Catholic clergyman: b. New York 28 Aug. 1839. He was graduated from the Ecclesiastical Academy in Rome in 1867, and having previously been raised to the rank of private chamberlain to Pope Pius IX., was the same year made prothonotary apostolic. He was rector of Saint Joseph's Church, Jersey City, N. J., from 1876-1902. He was a lecturer at the Catholic University in Washington and at Seton Hall College, New Jersey, and is the author of 'Mémorial, Letters and Journal of Elizabeth Seton' (1869); 'Roman Essays' (1882); 'The Dignity of Labor' (1893); 'An Old Family' (1899).

Seton, a skein of silk, cotton, etc., passed under the true skin and the cellular tissue beneath, in order to maintain an artificial issue. The name, which is derived from the Latin *seta*, a bristle, stiff coarse hair, because hair was originally used for the purpose, is also given to the issue itself. To insert a seton the surgeon takes a fold of the skin between his fingers, and makes an incision at the base either with a knife or with a seton needle. In the former case the seton must be inserted by means of a probe, but when a seton-needle is used that instrument carries the seton along with it. When the seton is inserted the wound is bandaged up not very tight, and allowed to remain untouched until suppuration has set in, usually the third or fourth day. After that the wound is dressed with fresh linen regularly once or twice a day, and when the seton has become hard and stiff a new one is inserted, by attaching one end of the new one to one end of the old, and then extracting the latter, so that the fresh one is dragged into its place.

Seton Hall College, in South Orange, N. J., founded in 1856 by James Roosevelt Bayley (q.v.), then bishop of Newark. It was orig-

inally in Madison, N. J., but was removed to South Orange in 1860. In 1861 it was incorporated by the legislature of New Jersey. It was named in memory of Ann Elizabeth Seton (q.v.). The first president was Bernard J. McQuaid, now bishop of Rochester, and the second Michael A. Corrigan (q.v.), afterward archbishop of New York. In 1865 the college building was enlarged, and on 27 Jan. 1866 the beautiful marble edifice was destroyed by fire. It was rebuilt and ready for occupancy in 1867. The college grounds contain 75 acres, and the number of buildings nine. The government is vested in a board of 13 trustees, of which the bishop of Newark is a member and president ex-officio. There are two courses of study, the classical and scientific. The classical course leads to the degree of Bachelor of Arts; the scientific course to Bachelor of Science. The courses of study are registered by the board of regents of the University of New York State, hence the students graduating may have entrance to the professional schools of New York. A high school, preparatory for the college, is maintained in connection with the college. Courses of lectures on literary and scientific subjects are established for the pupils, and the public are admitted free of charge. The library, which is in a building of its own contains approximately 40,000 volumes. The college offers three full scholarships in the classical course, granted to worthy applicants by a competitive examination; they entitle the holders to board and tuition until graduated. A fund to assist worthy students has been created. In 1910 there were connected with the school 18 professors and instructors, and 218 students.

Setter, a breed of dogs, named from their former habit of crouching or "setting," on observing the game which they are trained to hunt. In modern days, however, these dogs remain erect on coming up with the quarry, and point their nose at it as does the pointer. For the "points" of the various kinds of American setters, see Dog.

Settignano, sât-tên-yâ'nô, **Desiderio da**. See **DESIDERIO DA SETTIGNANO**.

Settlements, Social. See **SOCIAL AND UNIVERSITY SETTLEMENTS**.

Settlers and Defenders of America, The, an association organized in 1899 to stimulate geographical, biographical and historical research, to publish patriotic manuscripts and records, and to collect colonial and Revolutionary relics. The general offices of the society are in New York.

Sevanga, syë-vân'gâ. See **GOKCHA**, a lake.

Seven, a number regarded by many nations as especially sacred, mystical and symbolical. In the Bible the work of creation having been completed in six days, the Creator rested on the seventh. The three *Regalim* or pilgrim festivals of the Hebrews (the Passover, the Festival of Weeks, and the Feast of the Tabernacles) lasted each seven days, and between Passover and the Festival of Weeks was an interval of seven weeks. Egypt's seven years of plenty are succeeded by seven years of dearth; for seven days the waters of Egypt were turned into blood. The seventh year was a sabbatical year, and the year following seven weeks of years was the year of jubilee.

The golden candlestick in Solomon's temple had seven lamps. In the New Testament occur many groups of seven, as, the seven churches of Asia, seven stars, seven trumpets, seven spirits, the seven horns and seven eyes of the lamb; all these in the Apocalypse. Among the Greeks the number seven was sacred to Apollo and to Dionysos; and it held a conspicuous place in the teachings of Pythagoras, who gave it many distinctive appellations. The sacraments of the Roman Catholic Church are seven, and also the orders of the ministry in the same church, namely, four minor and three major or sacred orders. Various reasons have been given for the peculiar regard had for this number, such as that seven is a symbol of completeness, being compounded of three and four, perfect numbers, they being representable in space by the triangle and the square.

Seven Champions of Christendom, The, a romance of chivalry, by Richard Johnson, entered on the 'Stationers' Register' in 1596. A second part appeared in 1608 and a third in 1616. In it are recounted the exploits of Saint George of England, Saint Denis of France, Saint James of Spain, Saint Anthony of Italy, Saint Andrew of Scotland, Saint Patrick of Ireland, and Saint David of Wales.

Seven Churches of Asia, The, a collective name applied to the churches of Ephesus, Smyrna, Pergamos, Thyatira, Sardis, Philadelphia, and Laodicea (Rev. i. 11).

Seven Cities, The, a name applied to Egypt, Jerusalem, Babylon, Athens, Rome, Constantinople, and either London or Paris. They are often grouped under this title, as embodying wealth, antiquity, greatness, and magnificence.

Seven Days' Battles, a series of battles which began 25 June 1862 by the advance of a part of Gen. McClellan's army, with a view to secure a more advantageous position for a general advance upon Richmond. McClellan's army, numbering 92,500 men, was within a few miles of the city, which was defended by Gen. Lee with an army, including Jackson's command, of 80,762 men. The advance brought on the battle of Oak Grove (q.v.), in which the loss was moderate, and with no particular advantage to either side. On the next day McClellan was thrown upon the defensive by the approach of "Stonewall" Jackson toward his right flank beyond the Chickahominy and by Lee's movement upon it. Lee threw the three strong divisions of A. P. Hill, Longstreet, and D. H. Hill across the Chickahominy to co-operate with Jackson, but, without waiting for him to get up, attacked Gen. McCall's division of Pennsylvania Reserves at Mechanicsville (q.v.) and Beaver Dam Creek, and was badly repulsed with great loss. On the 27th McClellan was withdrawn, Jackson made connection with Lee, and the combined Confederate forces attacked Fitz-John Porter's corps and McCall's division, later reinforced by Slocum's division, at Gaines' Mill (q.v.), the result being a bad defeat for the Union forces, Lee's losses, however, in killed and wounded, being about double that of Porter. Porter retreated across the Chickahominy, and McClellan started on his retreat or change of base to James River. Lee pursued, and on the 29th fought the two battles of Peach Orchard and Savage Station (qq.v.), both of which were drawn.

SEVEN GIFTS—SEVEN WISE MASTERS

battles, although in both cases the Union troops withdrew from the field to continue the retreat, that they had successfully covered. On the 30th, part of the Union army and nearly all Lee's army fought the bloody battle of Glendale (q.v.), the Union army holding the ground until after dark, covering the passage of the trains, and defeating all of Lee's persistent efforts to break and destroy it. The last of the seven days' battles was fought at Malvern Hill (q.v.) 1 July, resulting in a bloody repulse for Lee, and that night the Army of the Potomac withdrew to Harrison's Landing on James River. "Gen. Lee's plans in the Seven Days' fight," says Gen. Longstreet, "were excellent, but were poorly executed." In an official report Gen. Lee says: "Under ordinary circumstances the Federal army should have been destroyed." That it was not destroyed is due to the skill of McClellan in conducting the retreat, but more to the fighting quality of his subordinate officers and their men. The Union loss (25 June to 1 July) was 1,734 killed, 8,062 wounded, and 6,053 captured or missing. The Confederate loss was 3,478 killed, 16,261 wounded, and 875 captured or missing. See **PENINSULA CAMPAIGN OF 1862.**

E. A. CARMAN.

Seven Gifts of the Holy Ghost: Wisdom, understanding, counsel, fortitude, knowledge, piety and the fear of the Lord. They are enumerated in Isaiah xi. 2, as rendered in the Septuagint, the Latin Vulgate and their versions: in the Douai English version the passage reads: "The Spirit of the Lord will rest upon him; the spirit of wisdom and understanding, the spirit of counsel and strength, the spirit of knowledge and piety, and the spirit of the fear of the Lord will fill him." With this the Authorized Version agrees save that after "knowledge," this only follows "and of the fear of the Lord"; and the Hebrew, too, has nothing answering to "piety."

Seven-Hilled City, a name applied to Rome.

Seven Hunters, The. See **FLANNAN ISLANDS.**

Seven Lamps of Architecture, The, a treatise on architecture by John Ruskin, published in 1847. In this book architecture is regarded as the revealing medium, or lamp, through which flame a people's passions, and which embodies their life, history, and religious faith, in temple, palace, and home. The first lamp is "Sacrifice," next comes the "Lamp of Truth," the third and fourth lamps are those of "Power" and "Beauty." The fifth is the "Lamp of Life," and the last two lamps are those of "Memory" and "Obedience." Ruskin affirms that "the architecture of a nation is great only when it is universal and established as its language, and when provincial differences in style are nothing more than so many dialects."

Seven Pines, Battle of. See **FAIR OAKS, BATTLE OF.**

Seven Sages. See **SEVEN WISE MEN.**

Seven Sleepers, a Christian legend dating from the times of persecution under the empire. According to the story, in the reign of Emperor Decius, when the Christians were persecuted, it is said that seven noble youths of Ephesus concealed themselves in a neighboring

cavern, the entrance of which was closed by order of the emperor. The persecuted youths immediately fell into a deep slumber, from which they were accidentally awakened in the reign of Theodosius II., after the lapse of about two centuries. Pressed with hunger after their long fast, they sent one of their number to the city to purchase bread. He was astonished to see crosses erected all over the city, and his own antiquated dress and obsolete language confounded the baker, to whom he offered an old medal in payment for bread. Suspected of having found a secret treasure, he was carried before the judge, to whom he related his miraculous story. The bishop of Ephesus, the magistrates, and the emperor himself, hastened to the cave, and found the sleepers still bearing the bloom of youth. They related their story to the multitude, gave them their benediction and expired.

Seven Stars. See **PLEIADES.**

Seven-up, a game of cards, sometimes called "all fours" from the four points (high, low, jack, and game) that are at stake.

Seven Weeks' War, the Austro-Prussian war of 1866, which grew indirectly out of the long-continued rivalry of the Prussian and Austrian nations, and was finally precipitated by the Schleswig-Holstein controversy. Prussia's support came from the majority of North German states, and from Italy, while the South German states, and Nassau, Frankfort, Hanover, etc. gave their assistance to Austria. Under Moltke the Prussians won victories in rapid succession, and in an astonishingly short period had outfought the Austrians, who met their final defeat in the battle of Königgrätz or Sadowa, 3 July after only about seven weeks of actual fighting. The negotiations at Nikolsburg, 26 July, were confirmed by the Peace of Prague and other acts of formal settlement, and the prestige of Prussia, greatly increased, was made dominant in the Franco-German war which soon followed. See **AUSTRIA; GERMANY; PRUSSIA.**

Seven Wise Masters, a collection of tales which originated in the East. The plot connecting the tales is the following: A king's son, who had been instructed in all branches of knowledge by seven wise masters, finds by the study of the stars that he is in danger of meeting his death if he utters a word within seven days. At the commencement of this period his stepmother urges her husband to put his son to death, at the same time telling him a story calculated to induce him to do so. The king is just about to act on this advice when one of the seven wise masters obtains a day's respite for the prince by telling a tale the moral of which counteracts that of the stepmother's. On each of the following six days during which the prince's danger binds him to silence, the stepmother renews her solicitations to the king to have the prince put to death, on each occasion supporting her advice by a fresh story, but the effect of the stepmother's tales is always counteracted by another told by one of the seven wise masters, until the expiration of the seven days enables the prince to reveal the designs of his stepmother. The date and circumstances of the origin of this collection of tales are unknown. The plot of the work is in fact found in Bud-

SEVEN WISE MEN — SEVEN YEARS' WAR

dhist literature, not as a fable but as a real event, but no Indian original of the collection of tales has been discovered. The tales were without doubt introduced into the West through the Crusades, since which the collection has been translated into almost all Western languages.

Seven Wise Men, or Seven Sages, of Greece, the collective designation of seven ancient philosophers and sages, namely, Solon of Athens, Thales of Miletus, Pittacus of Mitylene, Bias of Priene, Chilon of Sparta, Cleobulus of Lindus, and Periander of Corinth; they all lived between 620 and 548 B.C.

Seven Wonders of the World, seven monuments remarkable for their splendor or magnitude. They are the pyramids of Egypt, the walls and hanging gardens of Babylon, the temple of Diana at Ephesus, the statue of the Olympian Jupiter at Athens, the Mausoleum, the Colossus of Rhodes, and the Pharos or lighthouse of Alexandria. This group of the seven wonders originated among the Greeks in the time of Alexander.

Seven Years' War, a war between Prussia and other European powers (1756-63). By the treaties of peace concluded at Breslau 28 July 1742, and at Dresden 25 Dec. 1745, Maria Theresa of Austria ceded to King Frederick II. six principalities of Silesia and the county of Glatz. In the hope of recovering them she concluded an alliance with Elizabeth, empress of Russia, brought over to her cause the king of Poland and elector of Saxony, Augustus III., and attempted to form a closer union with France. Meanwhile a dispute had arisen between Great Britain and France relating to their American boundary, and it broke out in 1755 into open hostilities. The king of England concluded an alliance with Prussia; and some months after France made a league with the court of Vienna. All the proceedings of the Russian, Austrian, and Saxon courts were discovered to Frederick, who resolved to anticipate his enemies. In August 1756, he invaded Saxony, occupied the capital, which had been deserted by the court, Leipsic, Wittenberg and Dresden; took possession of the documents necessary to justify his conduct which he found in the archives of the cabinet in the last city, and invested the Saxon army in their fortified camp at Pirna. Meanwhile Field-Marshal Browne advanced from Bohemia with an army to liberate Saxony; but Frederick was able to check his advance, and the Saxons, 14,000 strong, were forced to surrender 15 October. The inferior officers and common soldiers were compelled to enter the Prussian service; but they soon deserted, making their escape to Poland, where the Saxon court resided during the whole war. Such was the end of the first campaign, and the Prussians remained through the winter in Saxony and Silesia. Frederick's invasion of Saxony was pronounced to be a violation of the Treaty of Westphalia, and France, as one of the guarantors of that treaty now took part in the struggle. Sweden and Russia adopted a similar course. In the diet at Ratisbon, held in January 1757, war was also declared on the part of the empire against Prussia.

Thus in 1757 Austria, Russia, France, Sweden, and the German empire were in arms against Frederick, while he had no ally but England

and few German states (Brunswick, Hesse-Cassel, and Gotha, besides, of course, Hanover). In order to be again beforehand with his enemies, Frederick (April 1757) marched into Bohemia, and on the 6th of May a bloody battle was fought at Prague, in which the Prussians conquered, but lost their distinguished general, Schwerin. The greatest part of the vanquished Austrian army threw itself into the city of Prague, to which the king immediately laid siege. But the defeat of Frederick by the Austrians under Daun, at Kollin, in the following month, 18 June, deprived the former of all his advantages. He was forced to raise the siege of Prague, and to retreat to Saxony and Lusatia. Little more than a month after, 26 July, the Duke of Cumberland, commanding the German allies of Frederick, was defeated at Hastenbeck on the Weser, in the south of Hanover, by the more numerous army of the French; whereupon the victors made preparations for taking up winter quarters with the imperial army in Saxony. The two armies had already united and advanced as far as the Saale, the French under the command of the incapable Prince Soubise, a favorite of the Marquise de Pompadour, when Frederick marched against them, and fought at Rossbach, a village between Merseburg and Weissenfels, that memorable battle, in which both the French and the imperial armies were defeated, and found safety only in a hasty flight 5 November. The defeated armies retired into winter quarters at a distance, and the possession of Saxony was secured to the king. Upon this Frederick hurried back to Silesia, which was now occupied by the Austrians. With a small army, fatigued with a long march, he defeated at Leuthen a force twice as great, under Daun 5 December. By this victory Frederick recovered Silesia, and he was now more formidable to his foes than ever; for not only had he been victorious himself, but while he had been thus occupied in the south and west his general Lehwald had successfully repelled the Swedes and Russians on the north and east.

The third campaign was opened in February 1758, by Ferdinand, Duke of Brunswick, who was now at the head of the allied armies, in the room of the Duke of Cumberland, and opposed the French in Lower Saxony and Westphalia. His nephew, the hereditary prince, afterward Duke of Brunswick, Charles William Ferdinand, commanded under him. Duke Ferdinand made himself master of the Weser, expelled the French, under Clermont, from Lower Saxony and Westphalia, and defeated them 23 June at Krefeld. He then returned over the Rhine to Hesse, where Soubise was stationed with a French army, and whither Clermont followed him. Ferdinand, in the meanwhile strengthened by 12,000 British troops, forced the two hostile bodies to retire over the Main and the Rhine, where they went into winter quarters. Meanwhile the Russians, under Bestucheff, had advanced as far as the Oder; and subsequently Fermor, who superseded Bestucheff, occupied east Prussia, and then moved into Brandenburg, spreading devastation on his way. At this juncture Frederick made a masterly march to the Oder, and toward the end of August engaged the Russians at Zorndorf, in the north of Brandenburg, where he gained a sanguinary victory, which forced the Russians to retreat to Poland.

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After this he again turned his attention to Saxony, where his brother Prince Henry was no longer able to resist the Austrians. He encamped at Hochkirch, but here he was surprised by Daun in the night of 14 October and suffered a total defeat. He nevertheless succeeded with the remains of his army in effecting a junction with his brother, after which he again drove the enemy out of Silesia and Saxony. At the close of the campaign the king saw all his dominions except Prussia proper free from the enemy. In France there was a general wish for peace; but Louis XV. and his mistress, the Marchioness de Pompadour, were bent on continuing the war. A new alliance was therefore concluded with Austria 30 Dec. 1758. Frederick, however, had also obtained a new treaty with Great Britain, which promised him a large yearly subsidy. Yet he determined in the coming campaign to act with his main army as much as possible on the defensive and to commit aggressive movements to detached corps.

The campaign was opened in March 1759, Prince Henry marching into Bohemia, where he dispersed the hostile forces, and captured immense quantities of military stores. He then entered Franconia, and put the inactive imperial forces to flight. At the same time the Prussian general Dohna drove back the Swedes once more to Stralsund, and managed to keep the Russians for a time in check. But when the Russians pressed forward in ever-increasing numbers under Soltikoff, Dohna found himself obliged to give way. Frederick then gave his command to Gen. Wedel, who received orders to prevent the junction between the Russians and Austrians at all costs, and accordingly on 23 July attacked the Russians at Kay, near Züllichau, in the east of Brandenburg. His attack was unsuccessful, and the Russians after their victory advanced to Frankfurt-on-the-Oder. Frederick now hastened in person to his electoral dominions, and on 12 August attacked the Russians at Kunersdorf, near Frankfurt, and had already defeated them when the victory was snatched from him by the Austrians, under Laudon, who inflicted on him a defeat such as he had never sustained before. The Russians purchased their victory dearly, and they made no use of it. Yet Frederick's position was extremely dangerous; indeed, he began to apprehend an unfortunate issue of the war. The Russians were victorious in his hereditary states; Daun was in Lusatia with a large army, and Saxony was overrun by the imperial troops. The Austrians and Russians wished to unite, but Prince Henry deprived the former of their magazines, and thus obliged them to retreat; and Frederick anticipated the Russians in their march to Silesia, and compelled them to retire to Poland. In the west Frederick's allies had been more successful. They had, indeed, been able to effect little at the beginning of the campaign. The French had taken Frankfurt-on-the-Main by surprise during the winter, and the plan for recovering the city was frustrated by the failure of the attack on Bergen 13 April. But 1 August Ferdinand gained a splendid victory at Minden over the French troops under Contades and Broglie. On the same day the hereditary Prince of Brunswick likewise defeated the French at Gohfeld, and they were driven over the Lahn on one side and over the Rhine on the other. The Swedes also, who, after

the battle of Kunersdorf, when Prussian Pomerania was destitute of troops, invaded that country, were driven by Manteuffel and Platen under the cannon of Stralsund. Thus, in spite of all his mishaps, Frederick's fortunes were still at the end of the campaign in the ascendant.

The campaign of 1760 seemed at first to forebode ill success to Frederick. While he himself was engaged in Saxony, the brave Gen. Fouqué suffered a defeat in Silesia, in consequence of which the Austrians occupied the whole land. Frederick thereupon gave up Saxony in order to recover Silesia. With 30,000 Prussians he marched into that province, and intrenched himself at Liegnitz. Here on 15 August he defeated Laudon, and thereby effected his purpose of recovering Silesia, but he was unable to prevent Austrian and Russian troops from breaking into Brandenburg and laying waste his hereditary dominions. Frederick hastened thither to cut off the enemy, but not finding them there he returned to Saxony, where the imperial forces were stationed, and Daun and Lascy had united. At Torgau, on the Elbe, he attacked the enemy 3 November defeated them in a bloody engagement, and then went into winter quarters in Saxony. The Russians were also forced to raise the siege of Colberg and to retire to Poland. The allied forces, under Ferdinand of Brunswick, defeated the French 31 July at Marburg; but the latter remained in Hesse.

In the opening of the next campaign 11 Feb. 1761 Ferdinand attacked the French in their quarters; they fled, losing many of their fortifications and magazines. A corps of French and Saxon troops was defeated 14 February at Langensalza; but the allies were obliged to raise the siege of Ziegenhain, Marburg, and Cassel with loss, and the French once more became masters of all Hesse, and had an unobstructed passage to Hanover. The proposals of peace now made by Britain and Prussia were not accepted, and Frederick endeavored to protect Silesia against the Austrians and Russians, who had united in August at Striegau. He and his allies, however, met with reverses at Schweidnitz, Colberg, and elsewhere, and despite some successes (as at Villingshausen) Frederick felt himself in a desperate condition. But at the very time when Frederick's distress was greatest, Elizabeth, the empress of Russia, died 5 Jan. 1762, and her successor, Peter III., concluded with him 5 May the Peace of Saint Petersburg. Sweden likewise made peace with Prussia, and the Russian emperor sent a body of troops to aid the Prussians. But the emperor's early death broke the alliance with Frederick, and his successor, Catharine II., recalled the Russian troops from the Prussian service. Frederick, however, was delivered from one dangerous enemy, and had gained an important preponderance of strength over the rest. After recovering Schweidnitz and providing for the defense of Silesia, he marched to Saxony. On 29 October an important victory was gained over the Austrian and imperial troops at Freiberg, and the king now concluded an armistice with the Austrians; but it related only to Saxony and Silesia. Under Duke Ferdinand and the hereditary prince of Brunswick the allies commenced, unsuccessfully, the campaign of 1762 against the French; but the latter were defeated 24 June at Wilhelmsthal, and driven from their fortified camp at

SEVENTEEN-YEAR LOCUST — SEVENTH DAY ADVENTISTS

Cassel. Cassel itself was besieged, and 1 November surrendered to the allies. Two days after this the preliminaries of peace between Britain and France were signed, and the peace itself was confirmed at Paris 10 Feb. 1763. After a short negotiation Frederick concluded a peace with Austria and Saxony at Hubertsburg, 15 February by which each power received again all the territories it had possessed before the war. The simultaneous struggle between Great Britain and France in North America and India ended in favor of the former. Consult: Frederic II., 'Histoire de la Guerre de Sept Ans' (1794-1801); Lloyd, 'History of the Seven Years' War' (1781-90); Carlyle, 'History of Frederick the Great'; Ranke, 'Ursprung des siebenjährigen Krieges' (1871); Parkman, 'Montcalm and Wolfe' (1884). See CANADA; FREDERICK II.; MARIA THERESA; PITT, WILLIAM.

Seventeen-year Locust, or Cicada. This insect (*Cicada septendecim*) is black, marked with bright orange and a white spot on the head just behind the eyes. There are four glassy wings, and the eyes are red. The length is about 1½ inches. When the insect emerges from the ground after its 17 years' burial it ascends a tree trunk or other convenient object and works its body rapidly backward and forward, breaking the pupal skin, from which the winged imago emerges. The cicadas pair at once. They then congregate on the branches of the trees in sufficient numbers to bend and at times break them by their weight. The woods and orchards resound with the din of the drums from morning to night.

The females lay the eggs in the twigs and small branches of trees. They repeatedly thrust the ovipositor obliquely into the bark and wood in the direction of the fibres, at the same time putting in motion the lateral saws which detach little splinters of wood and make a fibrous lid over the whole. In each fissure made by the piercer the female deposits from 10 to 20 eggs in pairs. It takes her a quarter of an hour to prepare one nest and fill it with eggs, and she usually makes between 15 to 20 fissures in one limb. She lays between 400 and 500 eggs and then soon dies. Six weeks later the eggs hatch. The young when it bursts the shell is grublike in form and has six legs, the first pair of which are large and claw-like, and the mouth is provided with a suctorial proboscis. After being hatched the young deliberately loosen their hold on the limb and fall to the earth. They instantly dig their way into the ground where they seek out the tender roots of plants. These they pierce with their beaks and draw out the vegetable juices which constitute their sole nourishment. They remain in the larval state for about 17 years, when they are full grown, pass into the pupal state, in which they remain but a few days, seek the surface of the ground and transform.

When a brood of cicadas is expected, no young trees should be set out for a year or two prior. The older trees are frequently able by their strength to live through the attacks. Extremely valuable shrubs and trees may be saved by being completely covered with mosquito netting, thus preventing the deposit of eggs.

For a record of broods, see CICADA; and for the musical apparatus, etc., see ORTHOPTERA.

Seventh Day Adventists. This denominational title was chosen because it most briefly expresses the specially distinctive features of their faith—(a) the nearness of the second coming of Christ to this world; and (b) the observance of the seventh day of the week as the Sabbath.

An Adventist is "one who believes in the second coming of Christ to establish a personal reign upon earth." Though there have been such believers ever since the announcement by the angels in the moments of the ascension of our Saviour (Acts i. 9, 10), the Adventists of modern times had their rise in 1833-44, at the time of that world-wide proclamation of the immediate coming of the Lord, in which, in the United States, William Miller (q.v.), of Low Hampton, N. Y., was the leader. In that great movement all these believers were simply Adventists; but after the passing of the time that had been set for the Lord to come in 1844, many of them adopted the observance of the seventh day, which is the Sabbath of the fourth commandment. And thus in 1844-5 originated the denomination of Seventh Day Adventists.

Yet this was not an arbitrary choice or assertion on the part of those who took that step. It was the unavoidable result of what seemed to them providential leading and Scripture connection. The basis of the calculation and expectation of the Adventists in all the world that the Lord would come in 1844 was the statement in the prophecy of Daniel (viii. 14) 'Unto two thousand and three hundred days then shall the sanctuary be cleansed.' By the clear evidence of the Scriptures throughout on that subject, also of history and chronology, Adventists believe that the period thus defined in the prophecy did expire in the autumn of 1844. There was no mistake in the calculation of the period: the mistake was with reference to the event that was to occur at the end of the period. The prophecy did not say that unto two thousand and three hundred days then shall the — Lord come; but "then shall the sanctuary be cleansed." But proceeding upon the accepted view that the earth was the sanctuary, and knowing that at the end of the world the earth is to be cleansed by fire from the presence of the Lord, they concluded that the cleansing of the sanctuary certainly involved the coming of the Lord in all His glory. However, when the time had passed without their expectation being in any sense fulfilled, they found by more careful study of the Scriptures that the sanctuary that was to be cleansed at the end of the prophetic period was not by any means the earth; but was "the sanctuary and the true tabernacle" of which Christ is high priest and minister; which is "in heaven" where He is at the right hand of the throne of God; and of which the sanctuary or tabernacle set up by God in the wilderness "was a figure for the time then present." (Heb. viii. 1; ix. 2-12, 23, 24; Rev. viii. 3, 4; xi. 19; xv. 5.) This study and discovery led them unavoidably to the consideration of the Ten Commandments, which, "written with the finger of God," were deposited in "the ark of His testament" in the most holy place of the sanctuary, both in the figure and in the true. (Ex. xxxi. 18; xxxii. 15, 16, 19; Deut. x. 1-5; Heb. ix. 4; Rev. xi. 19.) Finding that the fourth commandment of the law

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of God distinctly declares that "the seventh day is the Sabbath of the Lord thy God," and commands that this day shall be observed holy unto Him; and deeming that, as subjects of the Most High, it became them to *obey* the precepts of His law, rather than to *interpret* them, they came to believe that true loyalty required that in the keeping of the fourth commandment they should observe the seventh day of the week, or Saturday, as the Sabbath; and not the first day, or Sunday, as they had been doing. Further than this: In the proclamation that they had made of the coming of the Lord, the words of the two messages of Revelation xiv. 6-8—"Fear God and give glory to Him, for the hour of His judgment is come"; and "Babylon is fallen"—had been the key notes. But now, as they reviewed their position, these messages appeared as the first two in a direct series of three inseparably connected: the third one following these two, and then all together composing a great threefold message which is to prepare the way for the coming of the Lord to reap the harvest of the earth. (Rev. xiv. 6-16.) And in the words of the third angel in this series of three they read the impressive words, "Here are they that keep the commandments of God and the faith of Jesus." The first two of these messages were essentially a part of their experience as Adventists. To them that experience was too full of the light and power and spirit of God ever to be questioned. From that basis they could not possibly escape the third angel's message, which was but the complement of the two which were essentially of their experience. In the study of the sanctuary and priesthood of Christ they had been already awakened to the claims of the Sabbath of the fourth commandment, and to the fact that they were not keeping that commandment. And now when their already awakened minds found the third angel's message calling "with a loud voice" every nation and kindred and tongue and people to the keeping of the commandments of God, as well as the faith of Jesus, this was the plain word of God, in the presence of which they could not hesitate. They, therefore, in sincere faith planted themselves firmly upon the word of God in the keeping of the fourth commandment by the observance of the very day specified in the commandment—the seventh day of the week—as the Sabbath of the Lord; and thus, in the keeping of all the commandments of God, and also the faith of Jesus, as revealed in His life on earth, and in His ministry in His heavenly priesthood and sanctuary. From that day forward the legend upon the banner of the Seventh Day Adventists has ever been "Here are they that keep the commandments of God and the faith of Jesus." Also, because of this leading and experience after 1844, the Seventh Day Adventists never have and never can set any time for the coming of the Lord, though ever insisting that "He is near, even at the doors."

Thus arose the denomination of Seventh Day Adventists. And because of this leading and experience, upon this revelation of the Word of God and the ministry of Christ in His priesthood in the true sanctuary, the well-understood and solely-claimed purpose of existence of the Seventh Day Adventists has ever been to make known to every nation and kindred and tongue

and people the claims, the blessings, and the power, the light, the life, the victory, and the joy that are revealed in the great three-fold message of God as written in Revelation xiv. 6-12. This, in the very nature of the case, makes them first of all a missionary people. Accordingly, though the denomination had its origin in New England, it has spread throughout the whole United States and almost the whole world: there being at the end of 1903 a mission, a church, or a conference in every State and Territory of the United States, and in every particular country of the world and the islands of the sea, except Venezuela, the Philippines, Tibet, Siam, Anam, and the Barbary States. The *principle of government* in the denomination is self-government with God in Jesus Christ by the power of the Spirit of God: Christ the Head of every man, and the one Master, and all the believers brethren. The *form of organization* begins with the individual believers in a community uniting in fellowship in a self-governing church. From this it extends to the Conference, composed of the Churches in a State or Province; to the Union Conference, composed of the Conferences in a district or country; and to the General Conference, composed of the Union Conferences and mission fields of the world. The Conference in session is composed of delegates from the Churches within the limits of such Conference; the Union Conference in session, of delegates from the Conferences within the limits of such Union Conference; and the General Conference in session is composed of the General Conference executive committee and officers, and delegates from the Union Conferences and mission fields of the world. At the end of 1903 there were in the world 16 Union Conferences, 82 Conferences, 40 mission fields, 2,120 churches, and 77,554 members; 59,292 of these members, 1,615 of the churches, 47 of the Conferences, and 7 of the Union Conferences are in the United States. There were 612 ordained ministers, 324 licensed ministers, and 662 missionary licentiates. The income for the year 1903, devoted directly to the proclamation of the faith, was \$684,030.54 from tithes, and \$216,342.98 from offerings (Mal. iii. 8-10). The tithe is not a tax levied, but the scriptural method of systematic giving, and is adopted by each individual upon his own free choice.

The one all-comprehending subject of the three-fold message that has called out the Seventh Day Adventists as a distinct denomination is The Everlasting Gospel: and this made only the more impressive by the declaration that "the hour of His judgment is come." Therefore the faith of the Seventh Day Adventist is thoroughly Protestant and strictly evangelical. They have no kind of specific creed. The Bible, just as the Bible is, is the sole standard; and the denomination holds itself free to advance in the increasing light and truth of the plain Word of God unto the utmost goal of the Christian faith—perfection in Christ Jesus. (Prov. iv. 18; Heb. vi. 1; Eph. iv. 7-15.)

This Everlasting Gospel is held as the whole Gospel for the whole man—body, soul, and spirit: as truly for the body as for the soul or spirit, as it is written, "I wish above all things that thou mayest prosper and be in health, even as thy soul prospereth"; and "Having these

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promises, dearly beloved, let us cleanse ourselves from all filthiness of the flesh and of the spirit, perfecting holiness in the fear of God." (3 John 2; 2 Cor. vii. 1.) Therefore an essential part of the preaching of this Gospel is the presentation of the Christian principles of health and recovery from disease, and of pure and temperate living. Accordingly, with the usually understood missionary work there is inseparably connected *medical* missionary work. Thus there are already established one medical missionary college, 47 regularly equipped sanitariums, and 25 treatment rooms, and the number is constantly increasing. These are in 19 countries of the world; the Medical Missionary College and the leading and largest sanitarium in the world are in the United States. And under the preaching of this Gospel there have been gathered, of all races and many nations, and from all conditions of life 77,000 people who eschew stimulants and narcotics of every kind, including tea, coffee, tobacco, impure food such as swine's flesh, and most largely flesh foods of all kinds, and use almost exclusively a vegetarian diet. Thus by the total rejection of every kind of stimulant and narcotic, of gross and impure foods, as to the body; and by the constant and unconditional surrender to the Spirit of God as to the heart and soul; being cleansed from all filthiness of the flesh and of the spirit, the believer goes on perfecting holiness in the fear of God, prospering and being in health even as his soul prospers, seeking to be sanctified wholly, body, soul, and spirit, and so to be preserved blameless unto the coming of the Lord. (1 Thess. v. 23.) It is the belief of the Seventh Day Adventists that the true faith of the Gospel calls for and accomplishes in the believer a mental as well as a spiritual and physical transformation (Eph. iv. 23), and that this requires that the education of Christians shall be purely Christian. To carry forward this phase of their work they have 15 colleges and academies and 20 preparatory schools in the United States, England, Germany, South Africa, Australia, Brazil, Argentine, Hawaii, Denmark, and Sweden. In these schools there are engaged about 170 teachers, and more than 1,800 students in the collegiate departments.

In the proclamation of the message, the publishing work necessarily holds an important place. They have 20 publishing houses, only 7 of which are in the United States, the other 15 being in 14 other countries. From these are issued 20 general periodicals in English, 5 in German, 4 in Spanish, 3 in French, 1 in Dutch, 1 in Finnish, 1 in Japanese, 1 in Portuguese, 1 in Icelandic, and 1 in the Fijian; and other publications in nearly 50 distinct languages. See ADVENTISTS.

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Seventh Day Baptists, a body of Christians who observe the seventh day of the week as the Sabbath. Such observance is very ancient both in Europe and Asia. Previous to the Reformation Christians who observed the seventh day as the Sabbath were called "Judaizers," and were subjected to persecution and obloquy on the charge of trying to draw Christians into Jewish practices. During the Reformation in

England the Sabbath-keepers, as they called themselves, were punished with much severity, and the writings of John Trask, Christopher Sands, and others show that their lot was not improved by the change in the national creed. Theophilus Brabourne wrote a plea in behalf of the seventh day Sabbath about 1630, which produced such an effect that King Charles I. commanded Bishop Francis White to reply in defense of Sunday, and Bishop White's answer was published in 1635. When Charles II. obtained the English crown and almost unlimited power he dealt more harshly with the Sabbatarians than his father had and there is reason to believe that the charge of treason on which the Rev. John James, pastor of the Sabbatarian Church at Mill Yard, Leman Street, London, was cruelly executed in 1661, was trumped up to punish him for his conscientious opinions, and to strike terror into his fellow-believers. A Seventh Day Baptist Church still flourishes at the same spot. Probably this act of monstrous injustice had something to do with the emigration of Sabbatarians to the United States, and the establishment of a congregation at Newport, R. I., in 1671. The Sabbatarian movement, while it has never made great progress, has advanced steadily and slowly. In 1818 the General Conference adopted the title of *Seventh Day Baptist*, instead of *Sabbatarian*. At the close of 1910 the denomination in the United States included 8,239 communicants, 96 ministers, and 82 churches. See *SABBATARIAN*.

Severinus, sêv-er-ê-nûs, Saint, the Apostle of Norica: b. either in northern Africa or southern Italy; d. Jan. 482. After the death of Attila in the 5th century he journeyed through the territory along the Danube, preaching Christianity, and through his courage and good works gained great influence over the people and made many converts. After his death his body was taken into Italy by Lucillus, one of his followers, and found its final resting place on a small island near Naples.

Severn, sêv'ern, **Joseph**, English artist: b. Hoxton 7 Dec. 1793; d. Rome, Italy, 3 Aug. 1879. He was self-taught and won, after great struggles, the Royal Academy historical painting prize in 1818. Early in life he formed a friendship for the poet Keats, for which he is chiefly noted; in 1820 accompanying the poet to Italy, and caring for him there till Keats' death the following year. He painted several portraits of Keats. In 1821 Severn exhibited 'The Death of Alcibiades' at the Royal Academy and won a traveling pension. He subsequently served as British and as Italian consul at Rome, where he lived until his death, devoting his time chiefly to the painting of miniatures. He wrote some, but his literary work is of no importance. He was buried near his poet-friend. His best known pictures are the 'Roman Beggar'; 'Specter Ship'; and his work on the altar of Saint Paul's Church, Rome. Consult Sharp, 'Life, Friendships, and Letters of Joseph Severn' (1892).

Severn, England, the second river in size and most important in the country, rises at Maes Hafren in Montgomery County, and after a winding course of about 200 miles, falls into

the Bristol Channel. The Vyrnwy enters the Severn on the Shropshire borders, the Wye, below Chepstow, and the Lower Avon about 8 miles below Bristol. At Welshpool the Severn begins to be navigable, about 178 miles above its mouth. Near Gloucester it branches, forming the Isle of Alney. It is a great tidal river, with a remarkable eager or bore; vessels of 400 tons can ascend as far as Worcester. Below Gloucester navigation is impeded, and its low banks at this point cause frequent inundations. A railway tunnel (4½ miles) passes under the estuary near the Wye.

Severo, sā-vā'rō, or Northeast Cape. See CHELYUSKIN, CAPE.

Severus, sē-vēr'us, Alexander. See ALEXANDER SEVERUS.

Severus, Lucius Septimius, Roman emperor: b. near Leptis, Magna, Africa, 146 A.D.; d. York, Britain, 211 A.D. After the murder of Pertinax, in March 193, he was proclaimed emperor by his troops at Carnuntum. Thereupon he marched to Rome to crush the partisans of Didius Julianus, who had meanwhile purchased the imperial purple from the Prætorians. On his approach Julian was deserted and assassinated by his own soldiers. In professing that he had assumed the purple only to revenge the death of the virtuous Pertinax, Severus gained many adherents, and was enabled to banish the Prætorians. But while he was victorious at Rome, Pescennius Niger was in the East at the head of a powerful army, by which he also had been called to the purple. Getting rid of the rivalry of Albinus by conferring upon him the title of Cæsar, Severus at once directed his arms against this eastern competitor. On the plains of Issus, Niger was totally ruined by the loss of 20,000 men (194). After devastating some territory beyond the Euphrates, Severus took Byzantium, which had shut her gates against him, but only after a protracted siege (196); and he then returned to Rome, resolved to destroy Albinus. He attempted to assassinate him by his emissaries; but when this failed, Severus had recourse to arms, and defeated Albinus near Lyons (197). After returning to Rome Severus marched into the East to repel an invasion of the Parthians; made himself master of Seleucia, Babylon, and Ctesiphon; and advanced far into the Parthian territories. From Parthia he marched toward the more southern provinces of Asia and entered Alexandria. A rebellion in northern Britain called him away again in 208. After penetrating to the far north of Caledonia, and losing a vast number of men, he returned southward, and rebuilt or repaired the wall of Hadrian across the island from the Tyne to the Solway Firth. The jurist Papirianus flourished during his reign and induced improvements in the administration of justice.

Severus, Wall of. See HADRIAN'S WALL.

Sevier, sē-vēr', John, American pioneer: b. Rockingham County, Va., 23 Sept. 1745; d. near Fort Decatur, Georgia, 24 Sept. 1815. Having founded the town of Newmarket, Shenandoah County, Va., and there become a celebrated Indian fighter, he served as captain in the Virginia line during Lord Dunmore's War (1774; see COLONIAL WARS IN AMERICA). He had removed in 1772 to the Watauga colony on the

western slope of the Alleghanies, and been, next to John Robertson (q.v.), the most prominent of the settlers. Now, at the beginning of the Revolution, he drafted a memorial to the legislature of North Carolina, requesting annexation to that colony; and as a result all of the present Tennessee was made a county of North Carolina and known as Washington district. He served in the North Carolina legislature and was appointed district judge at Watauga. Elected colonel of the trans-Alleghany forces, he commanded in many Indian fights, distinguishing himself at Boyd's Creek (1779) and King's Mountain (1780). After the war, North Carolina found that the retention of the large section now known as Tennessee would entail obligations for a corresponding portion of the Federal debt, and therefore the tract was made over to the central government. The settlers then determined to organize an independent State and regularly apply for admission to the Union. At a convention held 23 Aug. 1784 Sevier was elected governor of the new State of Franklin, as it was called. North Carolina now recognized its mistake, and granted Watauga a superior court, besides organizing the militia troops into a brigade with Sevier as brigadier. But Sevier entered office as governor 1 March 1785, reorganized the military, established a superior court, and concluded treaties with the Cherokees. In 1787 Governor Caswell of North Carolina declared the Franklin government a revolt, subdued it by force of arms, imprisoned Sevier, and ceded the region to the Federal government. Sevier was afterward made brigadier-general of forces in the territory south of the Ohio, in 1790 elected as first representative of Congress from the Mississippi Valley, and in 1796 was elected governor of the new State of Tennessee, serving three successive terms. In 1803 he was re-elected, and again served three terms consecutively. He was chosen to Congress in 1811, and returned for a third term. Consult Gilmore, 'Rear-Guard of the Revolution,' and 'Life' (1887).

Sevier, a salt lake in Millard County, in Utah, just west of the Beaver River Range; in lat. 30° N., lon. 130° 10' W., and at an altitude of 4,000 feet. Sevier River enters it on the north, and it has no apparent outlet. The water lines of the valley surrounding the lake show that at one time it was of considerable extent and was a part of Lake Bonneville (q.v.), together with Great Salt Lake, Lake Lakeshore, and other bodies of salt water in the vicinity. In 1872 Sevier Lake was 28 miles long, 10 miles wide, and had a surface area of 188 square miles. For over 30 years the waters of Sevier River have been used for irrigation, and so great is the quantity now used for this purpose that during the summer months the bed of the lake is almost dry, and the salts have been precipitated so as to form a crust over the lake bottom. This crust is composed of about three fourths sodium chloride, and the other fourth is nearly all magnesium sulphate and sodium sulphate. The crust is estimated to be of about 1,500,000,000 tons. The only animal life found in the lake are *Artemia*, a species of brown shrimp and the larvæ of some insects. Fishes entering the lake from the river are poisoned by the strong brine.

SEVIGNÉ—SEVILLE

Séigné, Marie de Rabutin-Chantal, mā-rē
 dē rā-bū-tān shān-tāl sâ-vên-yâ, MARQUISE DE,
 French writer: b. Paris, France, 5 Feb. 1626; d.
 Grignan, Drôme, France, 17 April 1696. She
 was the daughter of Baron de Chantal, was left
 an orphan in 1633, and brought up by her ma-
 ternal grandparents, and by her uncle, the Abbé
 of Livry. She was married in 1644 to the Mar-
 quis Henri de Séigné, who was killed in a
 duel in 1651, leaving her the mother of a son
 and a daughter. Though gifted with wealth,
 beauty, talent, and high social position, she made
 no second marriage, but devoted herself to the
 education of her children, and to reading, mean-
 while moving as one of the most brilliant mem-
 bers of the literary circle of the Hôtel Ram-
 bouillet. She was devotedly attached to her
 daughter, who was married in 1669 to the Comte
 de Grignan, and shortly afterward accompanied
 him to Provence, where he had been appointed
 lieutenant-governor. This separation resulted
 in the voluminous correspondence, which, while
 not intended for publication, has since been
 given to the world, and has made the writer
 famous, the letters being models of literary style
 and of great historical value. They cover a
 period of only about seven years, as after 1687
 Madame de Séigné was rarely separated from
 her daughter, who died in 1694. The corre-
 spondence abounds in delightful gossip, witty
 anecdote, clever remarks on men and topics of
 the day, and graceful delineation of the pleasures
 and gaieties of Parisian society. They mirror
 the life of the woman who was in turn the
 noted beauty of the court, the brilliant wit of
 the Hôtel Rambouillet, the religious devotee, the
 woman of business, endeavoring to make her
 income meet the demands placed upon it by her
 extravagant son, the appreciative student of
 Virgil, Montaigne, Molière, Pascal, Arnauld,
 Quintilian, Tacitus, and Corneille, and always
 the devoted mother, deploring the enforced sepa-
 ration from her daughter. They fill 14 large
 volumes, and were first published in 1726. Suc-
 cessive editions have appeared at intervals, the
 best being that of Monmerqué in the 'Grands
 Ecrivains' series (14 vols., 1862-6), completed
 by the 'Lettres Inédites of Capmas' (2 vols.,
 1872). Consult: Walckenaer, 'Mémoires touch-
 ant la Vie et les Ecrits de Madame de Sé-
 igné' (1842); Combes, 'Madame de Séigné
 historienne' (1885); Saporta, 'La famille de
 Madame de Séigné en province' (1889).

Seville, sêv'īl or sê-vīl', or Sevilla, sâ-vêl'-
 yâ, Spain, (1) capital of the province of the
 same name, on the east bank of the Guadal-
 quivir, 62 miles northeast of Cadiz. The prin-
 cipal buildings are grouped around or near the
 Plaza del Triunfo. The great Gothic cathed-
 ral, which ranks next to Saint Peter's at Rome,
 was built (1401-1519) on the site of a Moorish
 mosque, and comprises a profusion of works of
 art and historical treasure, paintings by Mu-
 rillo, De Vargas, etc., gilt and colored wood
 carvings by Dancart (1482), fine sculptures and
 superb metal work, costly and curious statues
 and reliquaries, a large organ, and above all the
 delicate Moorish stone and marble tracery which
 decorates the interior. In the nave are the
 tombs of Ferdinand III., and of Ferdinand, the
 son of Columbus. The approach is made by a
 high flight of steps, and the cathedral is sur-

rounded by the shafts of 100 antique col-
 umns. The east and north portals contain
 respectively some fine sculpture and bronze
 doorways. The immense clustered pillars, the
 magnificent stained glass by Flemish artists, and
 the Giralda (q.v.) or Bell Tower (the finest in
 Europe) are interesting features. North of the
 cathedral is the Patro de los Naranjos, with the
 library of Columbus—containing some valuable
 works and manuscripts—and the original
 Moorish fountain. The Alcázar is the chief
 specimen of Moorish architecture in Seville, and
 only second to the Alhambra in beauty and in-
 terest. It was founded in 1181, was the Arabian
 royal palace, and was surrounded by walls and
 towers. Its most conspicuous features are: the
 façade, the hall of ambassadors, and the patro
 de las muñecas. In the rear are beautiful gar-
 dens. The Exchange contains many historical
 documents. The Ayuntamiento or city hall is a
 fine specimen of the Renaissance, between the
 Plaza de la Constitución and the Plaza de San
 Fernando. Adjoining is the Audiencia or Court
 of Justice. The other noteworthy buildings are
 the Casa de Pilatos (15th century), with a fine
 colonnade and courtyard and the Casa de las
 Dueñas, with numerous courtyards and nine
 fountains. The remarkable churches include
 Omnium Sanctorum, San Marcos, Santa Maria
 la Blanca (an ancient synagogue), and La
 Caribad (the latter containing several *chef*
d'œuvres by Murillo and by Valde's Leal.
 Many of the churches, in themselves uninter-
 esting, contain masterpieces of sculpture and paint-
 ing. The museum contains works of art of ines-
 timable value, representing the School of Seville
 (16th and 17th centuries). Other notable build-
 ings include the University (1254) (1567), for-
 merly a convent; the archbishop's palace; the
 royal cigar factory, "Fábrica de Tabacos," an
 enormous and palatial building, with many courts,
 fountains, and tropical plants; the palace of San
 Telmo and the picture gallery. The chief
 squares not mentioned are the Plaza Nueva, the
 Plaza del Duque, the large bull-ring, which
 ranks next to that at Madrid, and the Quema-
 dero, the former scene of the *Autos-da-fé*. Las
 Delicias is a charming promenade along the
 river bank. The suburb of Triana is inhabited
 by gypsies and the poorer class. The Guadal-
 quivir is a tidal river, and navigable for large
 vessels into the city itself. Seville has always
 been an important commercial port. The exports
 include lead, quicksilver, iron ore, olives,
 oranges, cork, and copper pyrites; the imports:
 timber, drugs, chemicals, coal, coke, machinery,
 petroleum, and coffee. The principal manufac-
 tures are: tobacco, porcelain, hardware, soap,
 leather goods, chocolate, corks, etc. The Pick-
 man tile factory at Cartuja is an old and noted
 porcelain manufactory. A railway connects the
 city with Cadiz and Cordova, and an iron bridge
 and two other bridges (one belonging to the
 railway) connect it with Triana (where typical
 peasant games and costumes are seen). Seville
 was first colonized by the Phœnicians, from
 whom it passed in turn to Romans, Vandals,
 Visigoths, Arabs, and was finally taken by Fer-
 dinand of Castile (1248), 300,000 Moors volun-
 tarily seeking exile. It suffered many revolu-
 tions prior to this period, and later was
 depopulated by a yellow fever scourge. Under
 Soult (1810) the French robbed the city of her

riches. The discovery of America gave the town considerable commercial importance as the seat of American trade. It is the birthplace of Velasquez Murillo, and other celebrities. Pop. about 160,000.

(2) The province has an area of 5,248 square miles, and forms a part of Andalusia. The summits of the Sierra Morina rise at the north to a high elevation; south, the surface is low and fertile. The Guadalquivir is the principal river, and its affluents are the Genil, the Guadira, and the Guadalimar. The province is exceedingly fertile and produces all cereals and vegetables. The exports include tobacco, leather, paper, chocolate, silk and woolen goods, glass, soap, and pottery. The chief European domestic animals are abundant, and in the higher districts occur copper, silver, lead, iron, coal, and salt mines, besides chalk and marble. Trade has developed rapidly by the building of railways in recent times. Four senators and twelve deputies represent the province in the Cortes. The chief towns are Sevilla (q.v.), Carmona, Constantina, Ecija, Lebrija, Marchena, Morón de la Frontera, Osuna, and Útrera. Pop. about 570,000.

Sèvres, sāv', France, in the department of Seine-et-Oise, on the Seine, lies about 10 miles southwest of Paris, and an equal distance from Versailles. Its celebrated porcelain manufactory, founded at Vincennes in 1745 and removed to Sèvres in 1756, was purchased by Louis XV., 1760. In 1876 the old and dilapidated buildings were replaced by a new structure, erected in the park of Saint Cloud. The Porcelain Museum contains numerous articles of china collected from all over the world, which represent every age and clime. A technical School of Mosaics was established here in 1875. Besides the celebrated Sèvres vases, painted glass and mosaics are made. In the artistic pottery the *pâte-sur-pâte* (or layers) method is used—original to this manufactory. The general effect is that of a cameo, though possessing greater delicacy and rich coloring. (See CERAMICS; PORCELAIN.) Sèvres has other manufactures of shawls, cordage, leather, and chemicals. It was occupied by the German troops in 1870, bombarded by the French a few weeks later, and attacked by the troops of the Commune in 1871. Pop. about 10,000.

Sèvres Porcelain. See PORCELAIN.

Sewage. See SANITARY ENGINEERING; WASTES, CITY, DISPOSAL OF; GARBAGE.

Sewall, sū'al, Frank, American Swedenborgian clergyman: b. Bath, Maine, 24 Sept. 1837. He was graduated from Bowdoin, in 1858, studied at the universities of Tübingen and Berlin, and afterward engaged in pastoral work in Ohio. He was president of Urbana University, Ohio, for 16 years, was engaged as a pastor in Glasgow, Scotland, for some time, and since 1890 has been engaged at Washington, D. C. He has written many books of a denominational and religious character, and has translated with much success from French and Italian poetry. His works include: 'The Christian Hymnal' (1867); 'Moody Mike' (1869); 'The New Metaphysics' (1888); translations, 'Poems of Giosue Carducci' (1892); and 'Sonnets of J. M. de Heredia' (1900); 'Swedenborg and Modern Idealism' (1902); etc.

Sewall, Jonathan Mitchell, American poet: b. Salem, Mass., 1748; d. Portsmouth, N. H., 29 March 1808. He studied at Harvard, was for a time in trade, but took up the law, practised in Grafton County, N. H., and became register of probate there in 1774. His songs and verses appeared widely in American newspapers in the Revolutionary time, 'War and Washington' being among those familiar to the army. Probably a good share of his poetry was, like 'On Independence,' of the "pompous, rhetorical, and truly ligneous variety." But he wrote for a performance of Addison's 'Cato' at Portsmouth (1788), an epilogue, the concluding two lines of which are frequently quoted:

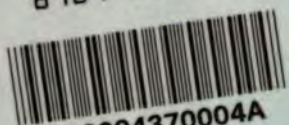
"No pent-up Utica contracts your powers,
But the whole boundless continent is yours!"

Sewall was a Federalist, and a "wit" of the time. A volume of his 'Poems' containing paraphrases of Ossian and of Washington's 'Farewell Address' appeared in 1801.

Sewall, May Wright, American educator: b. Milwaukee, Wis., 27 May 1844. She was graduated from the Northwestern University, Watertown, Wis., in 1866, and was married to Theodore Lovett Sewall (d. 1895) in 1880. She has been prominently connected with various woman suffrage associations, has lectured extensively on woman's suffrage, and has served as delegate to numerous congresses in connection with that movement. She was a commissioner to the Paris Exposition in 1900, and was commissioned by President McKinley to the Congresses held in Paris in that year. She is principal of the Girls' Classical School founded in Indianapolis by her husband, and has published various articles on literary and reform subjects, besides 'Historical Resumé of the World's Congress of Representative Women.'

Sewall, Samuel, American jurist: b. Bishoptoke, Hampshire, England, 28 March 1652; d. Boston, Mass., 1 Jan. 1730. He was graduated from Harvard in 1671, was ordained to the ministry, but was "diverted into a prosperous and benign secular career," started a printing-press at Boston, and entered public life as a member of the board of assistants. In 1692 he was made a member of the council and judge of the probate court, and in the latter capacity joined in the sentence of condemnation against witches at the time of the historic delusion. When he had realized his error he made in 1697 a public confession in church, and afterward spent therefore one day annually in fasting and prayer. He was appointed judge of the supreme court of Massachusetts, and from 1718 until his retirement in 1728 was its chief justice. He was possibly the first in America to attack negro slavery, publishing on the subject 'The Selling of Joseph' (1700), a three-page tract of much eloquence. But he is best known for his diary, a garrulous detail of every sort of minutiae, comparable in this sort to Pepys or Evelyn, and extending from 1674 to 1729. It naturally affords a most valuable source for the political and social history of the colony. In fact, "we have (Chamberlain) no other book like it." Tyler calls Sewall "great by almost every measure of greatness." The diary was printed in Volume V. of the fifth series of the 'Collections' of the Massachusetts Historical Society.

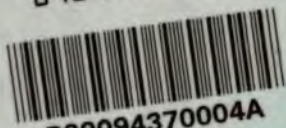
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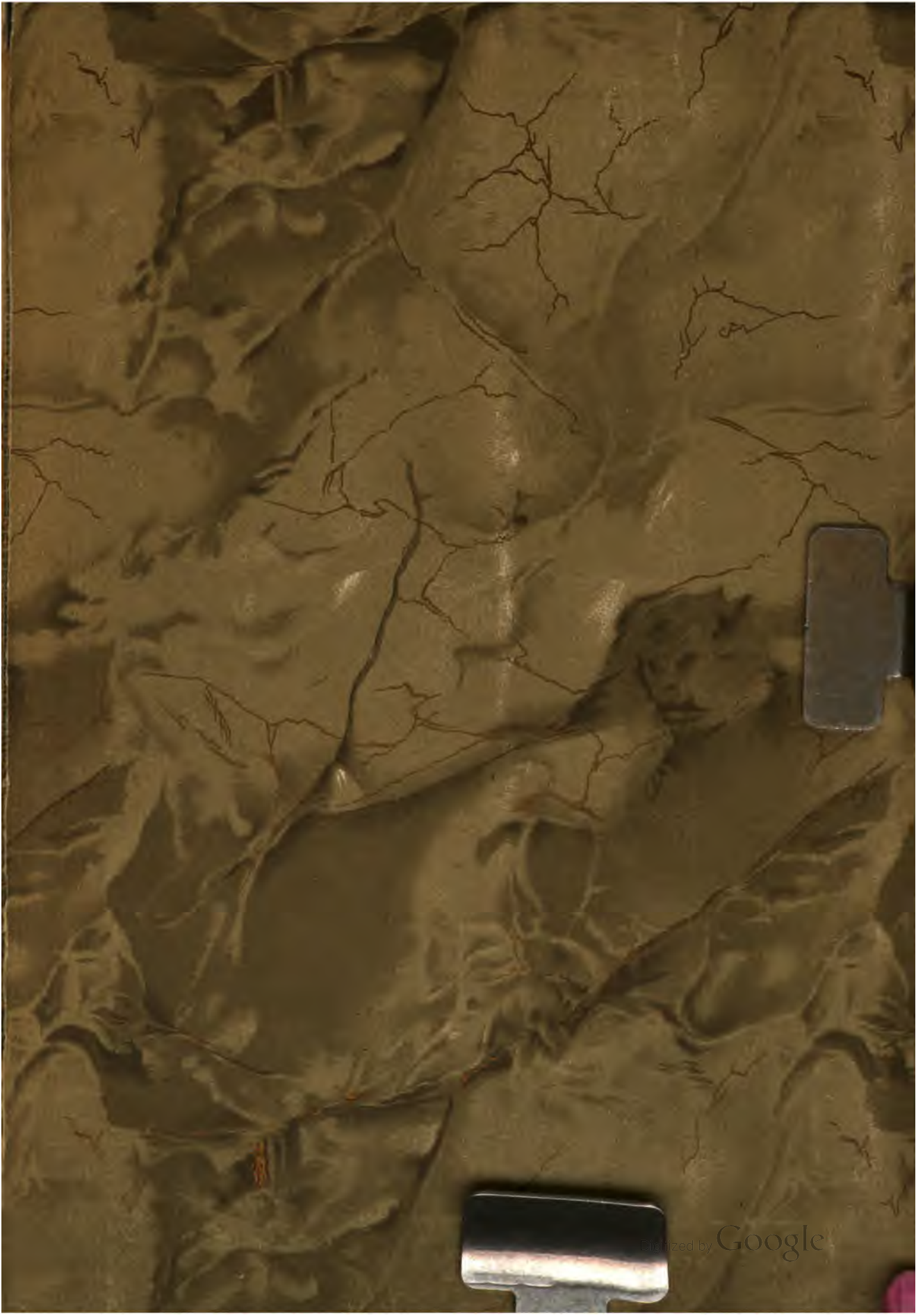
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